THE IRON AGE

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Institute Pledged to Country's Cause

President Gary Rededicates the Industry to Patriotic Policy

Semi-Annual Meeting Notable for Unusual Features, Including Visit to Aberdeen Proving Ground—Earl of Birkenhead Speaks on War and Peace—History of Establishing and Abolishing the Long Day in Iron Industry Related

THE American Iron and Steel Institute, since it was organized in 1908, has had numerous meetings important not only to the members of the institute but to the country and to the world, including those never-to-be-forgotten sessions during the war and those of post bellum days at which Foch, Pershing and other great leaders were guests of honor. The twenty-fourth semi-annual meeting last week in New York takes high rank among the others in the history of the institute, not only on account of the business sessions of Thursday and the banquet in the evening at which the distinguished Earl of Birkenhead was the principal speaker, but also because the memorial services to the late Henry Marion Howe and the visit of 275 members to the Aberdeen Proving Ground on Friday created an atmosphere of unusual spiritual and patriotic inspiration.

THE affairs of every man and every line of business should be so conducted, continuously, consistently and persistently, that there could be no just cause for reproach.—From President Gary's address.

After the two sessions Thursday at the Hotel Commodore, memorial services were held at five o'clock at the Cathedral of St. John the Divine at which Prof. Michael Pupin, Professor of Electrical Mechanics, Columbia University, delivered the address. Part of the very dignified services was the singing by the boys' choir and the audience of the Battle Hymn of the Republic, written by Dr. Howe's mother, Julia Ward Howe. Dr. Pupin's address will be found in full elsewhere in this issue of THE IRON AGE.

Standing at Aberdeen in the open air, surrounded by members of the institute and of the Army Ordnance Association, President Gary solemnly rededicated the great industry which he represented to the service of the country and at the same time expressed the fervent hope that its services would not be needed in another war.

After the luncheon served at midday, visitors and members of the Ordnance Association assembled in front of the service building and a brief meeting was held. President Crowell of the association presided and introduced as first speaker, President Gary, who began by graciously expressing appreciation of the members of the institute for the invitation to visit the proving ground and for the splendid program which was being carried out.

"The Army," said Judge Gary, "recognizes the importance of manufacturers of iron and steel in time of war and peace, for if the Army is to be efficient, the industries are likewise important in time of peace to help in developing means of military defense if and when it becomes necessary. A competent military force is the first essential for the protection and preservation of our great country, and the iron and steel industry is ever ready to do its part in strengthening that military force. The Army is and should be always opposed to war, but always ready to fight if it becomes necessary. The soldiers most competent to fight are those who are strongest in maintaining peace but ready to do their full duty when the call of their country comes.

MORE and more the general public will give attention to our stewardship. We should not resent nor disregard honest or deserved criticism. Even though sometimes, through lack of information or because of vicious motives, there may be unjust criticism, if it is based on a fragment of truth there should be no objection on our part.—From President Gary's address.

"It is not becoming of me," added Judge Gary, "to say much about what we of the iron and steel industry did during the great war. But I may say that from the time the Secretary of War and the Secretary of the Navy asked us to mobilize the industry in the cause of our country until the last gun was fired, we never failed in doing our utmost and we now renew our pledge of allegiance and our promise to serve our country whenever the call may come. At such a time, we shall be proud to follow

the lead of such soldiers as we see here today, such gentlemen of high character. I can promise that you can depend upon members of the American Iron and Steel Institute."

Charles M. Schwab spoke briefly, referring particularly to the patriotism of the iron and steel plants, and in conclusion Major-General C. C. Williams, Chief of Ordnance, thanked the members of the institute for their visit and for their promise of support of the Government.

The Institute Papers

The papers were of the usual high order. At the conclusion of his address, President Gary made an appeal to the members not to leave the room. He urged them to stay and hear the papers which he said had been prepared with great care by able men and were worthy of attention. While he realized that in the past there had been some excuse for members not remaining throughout the sessions owing to the difficulty of hearing some of the authors who read papers, this condition no longer obtained on account of the amplifiers having been installed.

As a result of Judge Gary's request, the attendance in the morning was unusually large, but the attendance at the afternoon session was about the same as in past years. A paper by Col. T. C. Dickson, commanding officer Watertown Arsenal, on "X-Ray Examination of Metals," attracted much favorable comment, especially on account of the very pleasing way in which the subject was presented. Colonel Dickson spoke extemporaneously and used many lantern slides. His address will be given more fully later. Chang Yu Wang, the author of a paper on "The Economics of the Iron Industry in China," was unable to be present, but his paper was read. It contains some original suggestions in regard to methods of figuring prices of ore.

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Lord Birkenhead said that he did not consider it profitable to debate the question, "Who won the war?" The French, the Italians, the Belgians, even the New Zealanders, might make a very good argument to show that they won the war, but he did not hesitate to say that the adhesion of the United States to the cause of the Allies at the critical time destroyed the morale of the German nation, including not only the soldiers but the officers of the German Government. "This," he said, "was because when your men began to come over, the Germans slowly came to realize that your infinite resources had become available for their enemies. They saw that when the soldiers of the United States came in millions, there would be, if necessary, more millions and then more millions and still more millions to take the places of those who fell fighting. They saw that to continue the war was hopeless." The earl discussed the debt problem and referred briefly to the League of Nations and the International World Court, saying that he was not an idealist and doubted whether the court or league could effect the results hoped for by their advocates.

Lord Birkenhead spoke at some length of the Peace Conference and said that he appreciated the position of the United States in not ratifying the treaty, as he believed that such a course would not be in harmony with the traditions of the country. He said: "England reluctantly adopted the propositions made by the great executive of your country because to infer that the principles which he advo-

The Price of Unpreparedness

Before introducing Judge Gary at the meeting at Aberdeen, Benedict Crowell, president of the Army Ordnance Association, read the following statement:

"The Central Powers mobilized 22,850,000 *men and inflicted* 22,090,000 *casualties on the troops of the Allied Powers;*

"The Allied and Associated Powers mobilized 42,189,444 *men and inflicted* 15,405,000 *casualties on the Central Powers—The Price of Unpreparedness!*

"It is for us to take action so that the United States will never again be without reasonable preparedness.

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In conclusion the speaker made an eloquent appeal for united action of English-speaking nations, saying that in such action lies the hope of the future of civilization.

Hussein Alai, the Minister of Persia to the United States, spoke at great length in regard to his country and its relation to the United States, making an appeal for American technical and financial assistance for Persia in its efforts to rehabilitate itself.

In accordance with a time honored custom, Mr. Schwab was the last speaker. With some new stories and his old earnestness, he closed the program of the evening.

The Visit to Aberdeen Proving Ground

Greatest Gun in United States Fires Shell Many Miles—Bombs Dropped from Airplanes—Demonstration of Tanks and Tractors

THE visit of the members of the American Iron and Steel Institute to the Aberdeen Proving Ground, about 26 miles from Baltimore, was made upon invitation of the Army Ordnance Association, the trip being by special train after the banquet Thursday night.

The visitors were entertained at the service building where three meals were served, and every detail of the elaborate program was carefully planned and skilfully carried out under the auspices of the association with direct supervision of Col. W. H. Tschappatt, commanding officer. The grounds are very large, being approximately 16 miles long and four miles wide, and it was necessary to go from one part to another by train and in automobiles. The site was selected in 1917 and its achievements in 1918 were of very great value. The first shot was fired Jan. 2., 1918, and activities were at their height when the armistice was declared on the following Nov. 11.

The members of the institute first witnessed the firing of one round of the 16-in. gun, the largest in the United States. It has a range of 28 miles. After hearing its mighty roar and inspecting its marvellous electrical equipment, the members inspected a 14-in. gun, the latest development in "railroad artillery," and also the largest which is believed practicable to construct. This gun, which weights about 75 tons and has complete electrical as well as hand control, fired one shell. The visitors next had their attention called to the armor plate which had been penetrated by an armor piercing projectile. They then witnessed the firing of the 8-in. howitzer, the 3-in. anti-aircraft gun, the dropping of the demolition bombs, the destroying of balloons by aircraft guns and the demonstration of movements of tanks and tractors.

An historical exhibit of field pieces which had been used in the United States Army from the time of the flintlock of 1776 down to the World War was inspected with keen interest. The exhibit was assembled from different parts of the United States by Captain L. M. Bricker, after much study of the history of guns.

Late in the afternoon came the demonstration by the battery of the Sixth Field Artillery, which fired shrapnel at fixed targets and put up a smoke barrage.

The visit to the museum was one of the most instructive features of the day. One feature of this museum consists of machine shops which were mounted for service in the war and actually rendered very important services. Similarly mounted shops are now in use in the Army.

The Display of Tanks and Tractors

The display of tanks and tractors indicated not only the kind of activity carried on during the war but also the developments which have been recorded since the armistice. The tanks and tractors dashed or lumbered about the big rough field in an amazing way, showing how obstructions which could not possibly be overcome by ordinary automobiles were matters of no importance to these implements of war. An extremely interesting model was the medium tank of 1921, a post-war development by the War Department embodying the ideas on tank design as determined by the war. This medium weight tank has the armor and armament of the large tanks combined with the mobility of the light tanks, in addition to speed greatly increased over that of either of the wartime light or heavy tanks. The maximum thickness of the armor is 1 in. on front and turret, the other armor being ⅝ to 4 in. thick. The tank is equipped with a Liberty engine. A radio-directed 6-ton tank which was developed during the war and extensively used was operated with commands from a radio station on "the main front." A 2½-ton tractor, model 1908, equipped with a Cadillac touring car engine and having a road speed of 15 miles per hour, attracted much attention as it dashed around among the tractors and tanks of slower movement.

Events of the Day at Aberdeen

One Round with 16-in. Gun on Barbette Carriage.

One Round with 14-in. Gun on Army Railroad Mount, Model 1920.

Firings of 8-in. Howitzer, Model 1920, with Split Trail and 155-mm. Gun on Self-propelled Mount, Mark IX.

Firings with 3-in. Antiaircraft Gun, Model 1918.

Firings at Two Balloons by Aircraft Machine Guns.

Dropped Two 600-lb. Demolition Bombs.

Small arms and Infantry weapons, including the various aircraft and infantry armament. Certain types of guns and material demonstrated.

Many rounds fired at night, bringing down balloons—Searchlights used.

Tanks

Medium tank, model 1921; medium tank, model 1922; Mark VIII tank with stroboscope; radio-directed 6-ton tank.

Tractors

Two and a half ton, model 1920, towing 75-mm. gun, model 1897, and limber; 2½-ton tractor, model 1918; 2½-ton tractor, model 1918, with increased cooling system, including coils for cooling crank case oil; 2½-ton tractor, model 1918, with Liberty truck engine; best "30" towing 4.7-in. gun, model 1906; Holt T-35 towing ¾-ton trailer; Pavesi (Italian) towing 3-ton trailer; Fordson tractor with Hadfield-Penfield adapter towing cargo carts, model 1923; Fordson tractor with standard wheels towing cargo carts, model 1923; 5-ton artillery tractor towing 155-mm. howitzer and limber;

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10-ton artillery tractor towing 155 mm. G. P. F.; Topp-Stewart tractor towing 3-ton convertible wheel and track-laying trailer.

Motor Carriages

Seventy-five-mm. gun motor carriage; 155-mm. gun motor carriage, model 1921; 155-mm. gun motor carriage, model 1920 (Christie); motor carriage, Mark III, for 240-mm. howitzer; 240-mm. howitzer motor carriage (St. Chamond), Mark IV and IVA.

Cross-Country Trucks

Six-wheeled Militor truck (with Chase type track); Dodge truck with Chase track; Nash with caterpillar adapters; Mark VII tractor caisson; roadless Mack truck; Christie Mack truck; cargo cart, model 1923.

Mobilizing Industries in Preparedness Program

Army Ordnance Association Meeting—Assistant Secretary of War Davis Tells of Plans for Allocating Plants Throughout the Country

A BUSINESS meeting of the Army Ordnance Association was held in the Administration Building at five o'clock, presided over by its president, Benedict Crowell, formerly Assistant Secretary of War. The objects of the association were explained and a number of new members were added to the roll.

Finally, as last number on the program, came the night firing on the main front. Many balloons were sent up, located by searchlights and promptly brought to earth, thrilling the spectators and bringing forth many outbursts of applause.

Assistant Secretary of War Dwight Davis stated that an Army and Navy Board is in existence for allocating plants as between the Army and Navy and that his office has allocated some 3000 industrial plants to particular supply branches which, in turn, have allocated them to various districts. This statement was given as one of the many efforts being made in connection with plans for industrial preparedness in which the iron and steel industry essentially is a dominating element. Proper control records for the purpose of coordinating procurement are being worked out, the assistant secretary said.

"But, above all, efficient personnel to carry out the plans is an absolute necessity," he said. "Each chief of a supply branch and the staff of the assistant secretary will need many men of ability, well trained through either Army schools or industrial experience, or, much better, through both to accomplish the desired objective satisfactorily. The Army is concentrating on a schooling system to train its supply officers in the war plans and in the proposed methods of executing them, but the regular officers can man only a small part of the organization in time of war. Business men, engineers, reserve officers, in fact, just such men as you gentlemen of this institute * * * will have to do the bulk. I sincerely hope, therefore, that you will keep up your interest in the great problem of preparing the country industrially for a maximum war effort because upon its sound solution may depend the saving of billions of dollars, thousands of human lives, and the economic welfare of the entire nation."

The assistant secretary divided the problem of industrial mobilization into three main questions: "What must we procure?" "Where can we procure?" and "How will we procure?" Answering the first question, he said that the seven supply branches into which the Army is divided have practically completed the calculations of the requirements by months, amounting to some 23,000 major and 700,000 total items.

"If from these we subtract our reserves, we definitely define our quantity procurement program and this can be worked out to develop in turn the quantities of steel, copper, nitrates, powder, explosives, etc., required," said the speaker.

The answer to the second question was said to be dependent upon the ability of the country to produce. It was declared that it is the desire of the War Department to spread the industrial load throughout the country on the basis of the country's industrial capabilities. With this view in mind, the country has been divided into districts and each chief of a supply branch is endeavoring now to ascertain through his chief of district the ability of that district to help him solve his war problem. The answer to the "How will we procure" was said to involve among many other questions the matter of standardized war contract forms, and the assistant secretary said these are being worked out on the basis of World War experience after consultation with hundreds of business men. A sound and expeditious scheme for payments, it was asserted, is likewise being studied. Plans also were said to be given study to avoid conflicts between branches of the Army and between departments of the Government as to use of specific plants, and as to priorities in raw materials, power, labor, transportation, etc.

President Gary Tells of Abolishing the Long Day

Congratulates Institute on the Change—Praises President Coolidge—Is Mildly Optimistic as to Business Conditions

PRESIDENT GARY devoted a large part of his address to a history of the abolishing of the twelve-hour day in the iron and steel industry. He then made some general observations in regard to business policies and principles, saying that honest or deserved criticism should not be resented or disregarded, but that business should be so conducted that there could be no just cause for reproach. He then touched briefly on the troubled conditions in Europe, referred with much feeling to the death of President Harding and spoke in terms of high praise of President Coolidge, quoting from the words of the new President uttered in past years, particularly those relating to the enforcement of the law, to protecting the rights of the weak and to every man doing his part. In opening, Judge Gary said:

"Hearty congratulations are extended to the members of the American Iron and Steel Institute upon the abolition of the twelve-hour day in the iron and steel industry of the United States of America! Long years ago, before most of the business organizations represented here today were created, the twelve-hour working day became established. To quote the words of Mr. Smith, an intelligent, fair-minded workman connected with the American Sheet & Tin Plate Co., at the annual meeting of the United States Steel Corporation, held in April, 1914: 'The employer never established the twelve-hour day. Every working man who helped

to build up the iron business helped to establish it, and the refusal in many cases to grant the twelve-hour day would have been a sufficient cause for a walk-out many a time.' The hours on duty were long, though the hard work was largely done by machinery, more and more so as improvements were installed; the compensation per day was comparatively large and the workmen, as a rule, insisted upon a continuance of the practice. Because a committee, appointed by the chairman of the Steel Corporation in 1911 and headed by the late Stuyvesant Fish, recommended elimination of the twelve-hour day at its plants, provided the iron and steel industry generally would do likewise, the corporation actively and persistently took steps to carry into practical effect the recommendation referred to. The records of these efforts are preserved and are clear.

IT may be assumed that President Coolidge will be governed by the same motives as those which have actuated an honorable and useful life. Consequently the prosperity of this country will apparently have cordial, appropriate and effective assistance from the national Government, limited only by established rules and principles and the general welfare of all the people.—From President Gary's address.

Considerable and increasing, though not satisfactory, success resulted, until the terrible World War was precipitated, when larger and still larger demand for steel to supply war necessities, first for foreign nations and later for our own country, compelled the utilization by manufacturers of every facility available for largest production. In the dark days of military conflict, no one in this country objected to twelve hours' work per day. The year after the armistice, for the first time, so far as your president recollects, gentlemen claiming to represent workmen demanded with many other things abolition of the twelve-hour day by the steel industry. This demand soon after became a slogan, used largely by gentlemen not in any way directly connected with manufacturing or with manual labor, but many of whom probably were influenced by good motives. The campaign that followed, the sometimes inaccurate representations and unjust accusations that were made, need not be mentioned, nor even remembered by those who suffered from unwarranted attack. We were helpless, for there was legitimately involved the question of propriety and desirability of continuing the twelve-hour day, and we were unwilling to do or say anything which could be construed as a defense of the twelve-hour day, which in our deliberations we had already admitted must be abrogated when and as circumstances should permit.

"From the date of the Fish report there has never been a statement by a prominent steel manufacturer in favor of the permanent continuance of the twelve-hour day in the steel industry, nor against its abolition whenever practicable.

"Finally came the friendly words from that grand and good man who occupied the highest position in the greatest of all nations, the President of our own beloved country. They are of record and are worth repeating: 'I know I need not tell you that I am utterly without disposition to meddle in affairs which are of no official concern to me. The story comes to me that you are contemplating the discontinuance of the twelve-hour day in the steel plants. I would be perfectly willing, if it seems desirable, to lend any consistent assistance in securing the acceptance of the principle in other large establishments. I am only writing to commend and tender any prudent assistance if you really have this plan in mind and you think it desirable to have anything like a concerted effort in the direction of this important change.' Then followed the dinner at the White House, attended by over 40 representative members of the iron and steel industry. Full report of this meeting was made at the annual meeting of the institute, May 26, 1922. It was then said and published: 'The President frankly told all of us what was in his mind. He said: "I declare I have no intention of intermeddling or interrupting and, least of all, of injuring the iron and steel industry. I think there is a well-defined and perhaps a growing sentiment throughout the country against the twelve-hour day and in favor of its abolishment. It seems clear that this cannot be done successfully except by the concerted disposition and action of the industry. I think if we can consistently get rid of the twelve-hour day, it ought to be done, and that is as far as I go. If I can be of benefit it would be very agreeable to me."' We told the President frankly all the facts, our difficulties and our desires. Then the president of the institute, at the White House, and at President Harding's request, dictated a statement of the meeting for publication.

"We pledged our cooperation with the President in the effort to eliminate the twelve-hour day in our industry so soon as it should be practicable.

"Gentlemen, that pledge has never been violated nor neglected nor its fulfillment unnecessarily postponed. Everyone familiar with all the facts will testify to the good faith and earnest endeavor of the industry.

"Now that you have concertedly, with practical unanimity and with most remarkable promptness, relegated to the past a practice you did not inaugurate, but have been willing to recognize as undesirable, you are entitled to praise for having risen to a great occasion involving, as we believe, no question of morals, but one that became a matter of public interest and concern.

"Except for a moderate recession in the volume of our business, which at the psychological moment released a large number of workmen, the change could not have been consummated without further delay.

WE shall probably be censured unduly and subjected to misrepresentation, as we sometimes have been in the past. We may be attacked by those who are vicious and unworthy, those whose motives are selfish or corrupt. In the main, however, it is probable sooner or later we shall receive our just deserts, either because claims against us are justified or because, if not, the public will understand and properly decide.—From President Gary's address.

"In bringing about this change we have met many obstacles, some very difficult. The full facts are not generally known. It is not necessary nor would it be useful to relate them at this time. We have been striving for the accomplishment of a change in business that would meet the demands of a sentiment, which was not one-sided or uncontroverted, as witnessed by volumes of letters we have received; and we are pleased and satisfied.

"The outstanding factor which brought about the necessary concert of action, at the time it was secured, was the good-natured, positive influence of the President, who comprehended our difficulties, and, though he hesitated to interfere, strongly urged a change in hours simply because he deemed it a matter of duty. His manner and method convinced everyone familiar with the facts of his sincerity and friendship. He was strong because he believed he was right. He made

friends, not enemies. We are glad that we gave heed to his advice and reciprocated his friendship, and that he was aware of this before his untimely and universally lamented departure for a better world."

The Administration and Business

In conclusion, President Gary said:

"What is the disposition of the President concerning the affairs of the country? This is shown by a statement recently made by one occupying a prominent official position as follows: 'It is very evidently the aim and effort of the Administration to encourage in every way policies in both business and politics which will tend to the elimination of agitation. The very evident desire in all governmental quarters is to extend the fullest assistance to the constructive forces of the country. The removal of elements of uncertainty and of misgivings, and the stabilization of business conditions, are a constant aim, and the feeling among those most familiar with the reflections of the business situation is that substantial progress is being made along these lines.'

THERE will be temporary interruptions, recessions, and there will be fluctuations, but the man of business courage, with a reasonably clear vision of the long future, pays little attention to temporary hesitation in business progress. He knows that the current of prosperity in the United States is so strong that even though it may be occasionally modified by unnatural or unreasonable obstructions, this will result in accumulation of volume and force which will soon be overwhelming and stronger than ever before.—From President Gary's address.

"It is also important to know the opinion of the Administration concerning the present trend of business. This likewise was referred to by the same authority already mentioned, as follows: 'The impression in Washington seems to be that industry throughout the country is proceeding on a commendably conservative basis, with avoidance, so far as possible, of unnecessary advances in prices, or avoidable expansions which would engender keen competition for labor. With a continuance of this general attitude, it is felt that business should continue generally good for the remainder of this year. While there is reticence about making prophecies for the future, the general opinion seems to be that if this attitude continues there can be reasonable assurance of a projection of generally satisfactory business conditions at least well into next year.' It is believed these statements represent the mind of President Coolidge.

"From these quotations and observations, the business men of this country may form an intelligent opinion as to what may be expected from the governmental administration concerning matters which at this time are of vital importance.

"If the business men will do their part and cooperate with the President and his assistants in conducting their affairs in conformity with the high ideals which we believe actuate the President in the performance of his duties as the chief executive, there is no reason to fear there will be a serious financial or commercial disturbance or depression during the next few months.

"There are, as always, some hindrances to the natural progress and prosperity in the United States. Those patent to everyone are the turbulent conditions in other countries, already alluded to; the unreasonably high and burdensome taxes, national, State and municipal; the high costs of production, in some lines unconscionable; and the high costs of living, measurably, though not altogether, brought about by those who complain the most.

"But there are many reasons for confidence in the economic future in this country, outside of those which are basic and permanent, including our enormous wealth and immense yearly income, which increases as the years go by.

"For the calendar year the iron and steel industry will show considerable profit, though not as much as the capital invested should produce. The new orders are not up to productive capacity, but together with those heretofore accumulated, have resulted in large shipments. In some lines the demand for immediate consumption has been, and still is, in excess of the ability to supply.

"It may be stated with confidence that the outlook is good. Inquiries for iron and steel are unusually large, many of them urgent. Purchases for railroad and general building purposes, for oil development and production, for canning purposes, for the automobile trade and many other lines are now very large as a total and from appearances may be expected to increase materially in volume during the next six months, unless something unforeseen shall be precipitated.

"The actual purchasing necessities of our commodities are very great at present, and there is plenty of money to pay for whatever is needed. It is up to business management in every line to take advantage of the opportunities offered. Let us have faith in the future and do our part, proceeding always with good judgment, prudence and within the limits of our resources, but steadily forward toward the goal of the prosperity which we know is ahead and will be greater than ever before."

Professor Pupin's Tribute to Henry Marion Howe

Memorial Services Held at Cathedral of St. John the Divine Attended by Members of Two Institutes and College Professors

MEMORIAL services to Henry Marion Howe, honorary member of the American Iron and Steel Institute, and eminent metallurgist, were held at the Cathedral of St. John the Divine, Thursday afternoon, Oct. 25. The attendance included members of the American Iron and Steel Institute and members of the board of directors of the American Institute of Mining and Metallurgical Engineers, of which Dr. Howe was a past president. Others in the congregation were Dean George B. Pegram and the faculty of the school of mines, engineering and chemistry of Columbia University, where, as professor of metallurgy, Dr. Howe won worldwide fame, and also a representation from the engineering faculty of New York University.

The service was conducted by the Rev. Henry P. Veazie, precentor of the Cathedral. A special memorial anthem was sung by the full cathedral choir. Dean Howard C. Robbins and other church dignitaries participated.

Michael I. Pupin, noted inventor and professor of electro-mechanics in Columbia, delivered the address, eulogizing Dr. Howe as one whose mental and spiritual attitude "put him in the rank of those great minds and souls which have made history by leading the intellectual and spiritual progress of man from chaos to cosmos." Professor Pupin said:

"The ancient and venerable custom of showing reverence to the blessed memory of a precious life has more than ordinary significance when that life represents one of the guiding lights in the history of humanity. Such a light was the life of Henry Marion Howe. Those who know him by his scientific achievements know that his life is a shining light in the history of science; those who had the good fortune to know him personally always felt that his great scientific achievements were the crowning result of splendid efforts of a superior mind guided by the light of a generous heart and a pious soul. What his work means to science is recorded and known to all who treasure that knowledge; it is a record which will not be forgotten as long as the science of metallurgy has any meaning.

"But the spiritual influence of the life of Henry Marion Howe is known only to those who had the good fortune to know him personally. I am one of these fortunates, and this memorial service offers me the rare privilege to refer briefly to a phase of that influence which was known to me. Twenty-five years ago I became greatly interested in the magnetic properties of steel. I consulted Professor Howe, who was then my colleague at Columbia University. One day I said to him: 'If iron did not have the small magnetic permeability at low magnetization that it has all my efforts in theory and experiment in the domain of electrical power transmission problems would have no technical value.' And then I added: 'It looks as if the good Lord had endowed iron with that remarkable property, in order to give a chance to a poor fellow like me.' Howe looked at me with his wonderfully luminous eyes and said: 'Yes, the good Lord endows all things with remarkable properties, apparently for no other purpose than to give us poor mortals a chance.' I saw in these words a simple statement of the religious creed of a great but very humble and pious scientist, to whom science meant a search for and a study of the remarkable properties of things which God created, and the knowledge of which gives us poor mortals a chance. This creed reminded me often of the scriptural words:

> Speak to the earth and the earth shall teach thee!

and

> Learn the truth and the truth shall make thee free.

"Howe always spoke to the earth, in order to learn from it the remarkable properties of its things, and when he had learned the lesson of this great teacher he was certain that he had gained knowledge which gives us poor mortals a chance, because it is the knowledge of truth which makes us free. Yes, Howe, I am sure, always considered the remarkable properties of things as God's messages, the deciphering of which supplies us mortals with morsels of the eternal truth, and he firmly believed that he who is blessed with many morsels of the eternal truth is truly rich and prosperous: rich in wisdom and prosperous in things which feed the spirit and make it grow. No man was ever more loyal to his mission of deciphering the messages of God and no man was ever more eager to struggle for the physical, intellectual and spiritual freedom of mankind by feeding the spirit of man with morsels of God's eternal truth than was Henry Marion Howe.

"I quote now from a letter of Professor Sauveur, published six years ago, when the John Fritz medal was conferred upon Howe. The letter says:

> Howe has rendered to metallurgists an inestimable service; and he alone could render it. Where most of us could see only chaos and obscurity, he is able to bring order. . . . This, I think, is his greatest achievement—the marvellous coordination which he has brought into the science of metallography through his genius and his labor, tremendous in quantity, marvellous in lucidity.

"The truth of these words never struck me more forcibly than during the last five years of Howe's life. He was then an honorary chairman of the engineering division of the National Research Council in Washington. I watched his activity and marveled at his power of coordination. No other human power is as godlike as this power. It is the fundamental guide of the destiny of the world.

"The Greeks of old believed that the world progressed from chaos to cosmos, from disorder to law and order. The book of Genesis supports that ancient belief, and modern science shows that all terrestrial organisms are endowed with a power of coordination which transforms the non-coordinated forms of energy radiated to us by the sun into coordinated forms and thus supplies a sustenance for all organic life on the earth. Cosmic energy moves from chaos to cosmos.

"Remember that the showers which water the forests, the fields and the meadows; that the gay blossoms of the promising spring, and the mellow fruit of the golden summer season derive their stimuli of activity and life from the coordination of the energy conveyed to them by the radio messages which are broadcasted by myriads and myriads of atoms in the white hot sun, each atom indifferent to the activity of every other atom. This absence of coordination between the activities of the atoms creates a chaos and these chaotic messages would have no meaning and would be lost forever, so far as our terrestrial world is concerned, if the terrestrial organisms were not provided with receiving instrumentalities which are tuned to the wave lengths of the messages intended for them. The power of coordination inherent in our terrestrial organisms and which helps the world to rise from chaos to cosmos is, therefore, based upon the beautiful laws of resonance and harmony.

"When we pass from the physical to the intellectual and spiritual world, we find there also a movement from chaos to cosmos, from disorder to coordination. This, as Professor Sauveur points out, is beautifully illustrated in the scientific life work of Henry Marion Howe. There must be also a power which coordinates the non-coordinated mental and spiritual energies in the messages conveyed to our minds and our souls by the thoughts and sentiments of other minds and souls. Why should we not believe that this power of coordination is also based upon resonance and harmony? Those who had the good fortune to know Howe personally feel, I am sure, just as I do, that his mental and spiritual attitude was that of resonance and harmony with his Creator and with the best thoughts of his fellowmen. That puts him in the rank of those great men who made history by leading the intellectual and spiritual progress of man from chaos to cosmos. I firmly believe that the coordinating power of these men was derived from being in tune with messages which are broadcasted from that great station which is the fountain of the eternal truth. When Newton coordinated the scientific achievements of his predecessors of many centuries before him and out of the chaos of known but apparently unrelated facts and principles he created the cosmos, the beautiful harmony of law and order of modern dynamics, he certainly was in tune with the messages conveyed to him by many minds of many centuries. One cannot contemplate this wonderful science without recognizing that there was a superhuman, a divine element of harmony in Newton's power of coordination.

"When Moses coordinated the moral and ethical experience of many, many centuries and formulated the ten commandments the work was so wonderful that the world believed it to be due to direct inspiration, a highly resonant message from heaven. When the vague moral principles of the many creeds and civilizations were coordinated and summed up in the words of a single sentence, 'Love thy neighbor as thyself,' the Christian world recognized in it a transcendental power of coordination, a heavenly harmony, which cannot belong to any mortal man, and hence our firm Christian belief that its possessor, our Lord Jesus Christ, is the son of God. The Christian world recognized in it the expression of that heavenly spirit which compelled even the brutal Roman soldier to look up to the cross and exclaim: 'Verily, verily, He is the son of God!'

"Let the blessed memory of Henry Marion Howe keep awake these ideas in our minds and thus strengthen us in the belief that humanity will always progress to higher and higher levels under the leadership of men who are in tune with the will of God and with the best of thoughts and sentiments of their fellowmen, and that some day man will live in an ideal democracy founded upon the divine doctrine,

"'*Love thy neighbor as thyself.*

"That was the doctrine of Jesus Christ. It was followed all his life by Henry Marion Howe."

Temperature and Charpy Impact Value

Investigation of the Influence Between These Elements in a Group of Steels of Varying Composition, Including Stainless Steels

BY F. C. LANGENBERG

DR. F. C. LANGENBERG, a native of Beverly, Ohio, obtained the degrees S.M. at Ohio University and D.S. in Metallurgy at Harvard University. While at Harvard, 1912 to 1915, he was assistant to Prof. Albert Sauveur. Since 1915 he has been metallurgist for the Watertown (Mass.) Arsenal and also director of the Testing Laboratories, Watertown. Additional duties as metallurgist in the Ordnance Department, U. S. Army were given him in 1919. During the last four years he has devoted some time to private practice.

TWELVE different steels, of analyses as shown in Table I, were tested at twenty different temperatures and with different conditions of heat treatment. These followed a set of six steels, previously similarly tested.

The material, received in rolled bars 1⅝ in. square, was marked, cut up, heat treated and machined into test bars, having the dimensions as in Fig. 1. One test bar was taken from each end of each length of the

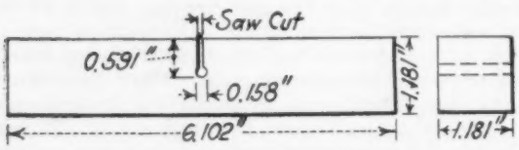


Fig. 1—Charpy Impact Test Bar

original bars received and tested in the annealed condition and at atmospheric temperature to establish the degree of uniformity of each steel.

Table II gives the foot-pounds absorbed in fracturing representative bars of the steel investigated, when in the annealed condition. The average foot-pounds and the mean divergence from the average, expressed in percentage of the average, are shown. These divergences run from about 3 per cent to 23 per cent.

Temperatures of tests in deg. Fahr. were as follows: —80, —40, —20, 0, 15, 32, 50, 70, 90, 110, 130, 150, 175, 200, 225, 250, 350, 500, 750 and 1000. Two test specimens were tested at each temperature. Temperatures below the atmospheric were obtained by immersing the test bars in a bath of acetone. The acetone bath was cooled to desired temperatures down to 0 deg. Fahr. by means of a calcium chloride solution cooled by an ordinary ammonia refrigerating apparatus. The lower temperatures were obtained by direct addition to the acetone of carbon dioxide snow. Temperatures from 90 deg. to 350 deg. Fahr. were obtained by heating the test bars in a Freas constant temperature oven, and from 500 deg. to 1000 deg. Fahr. the test bars were heated in a Hoskins electric muffle furnace.

Table I—Chemical Composition and Method of Manufacture

Steel	Analyses in Per Cent C	Mn	P	S	Si	Ni	Cr
J	0.57	0.36	0.010	0.015	0.268	0.14	0.54
K	0.38	0.18	0.018	0.022	1.460	23.75	7.08
M	0.40	0.70	0.037	0.060	0.260	0.26	0.12
N	0.56	0.31	0.013	0.025	0.190	1.15	2.28
O	0.11	0.35	0.019	0.022	0.210	3.76	1.39
P	0.39	0.46	0.013	0.025	0.220	3.44	1.58
R	0.22	0.52	0.010	0.021	0.235	0.09	0.91
S	0.38	0.74	0.018	0.022	0.250	0.09	0.79
T	0.23	0.75	0.010	0.031	0.410	trace	0.81
U	0.44	0.71	0.023	0.021	0.455	0.24	0.77
W	0.21	0.50	0.010	0.037	0.225	1.97	0.85
X	0.49	0.34	0.020	0.022	0.165	1.76	0.99

All were electric furnace steels except M, which was made in an acid open-hearth furnace.

Steel J—Similar to the standard S.A.E. No. 7260. Largely used for valves of internal combustion engines. Contains 1.51 per cent W.

Steel K—A steel of the "Stainless" type.

Steel M—Similar to S.A.E. No. 1040. A common structural steel.

Steel N—A rather uncommon steel. Can be used for gears and high duty parts.

Steel O—Similar to S.A.E. No. 3312. A high nickel-chromium steel suitable for case hardening.

Steel P—Similar to S.A.E. No. 3340. A high nickel-chromium steel suitable for high duty structural parts.

Steel R—Similar to S.A.E. No. 6120. A chromium-vanadium steel suitable for case hardening. Contains 0.15 per cent V.

Steel S—Similar to S.A.E. No. 6140. A chromium-vanadium steel suitable for structural parts. Contains 0.15 per cent V.

Steel T—Similar to S.A.E. No. 5120. A case hardening steel, although carbon is slightly higher than commonly desired for this purpose.

Steel U—Similar to S.A.E. No. 5140. Suitable for structural parts.

Steel W—Similar to S.A.E. No. 3220. Sometimes used for case hardening but inferior to a steel containing less carbon.

Steel X—Similar to S.A.E. No. 3250. Suitable for structural parts.

Discussion of Results

Table VI [not reproduced here] shows the average foot-pounds absorbed in the Charpy tests by each steel at each temperature. These figures are also represented graphically in the curves plotted for each steel tested.

Table II—Impact Values in Foot-Pounds and Brinell Number of Annealed End Bars

Test Specimens	Steels J	K	N	O	P	R	S	T	U	W	X
1	....	463.9	378.9	455.2	392.2	1151.4	532.9	....	....	495.3	438.1
2	121.2	552.9	378.9	448.3	482.1	844.5	510.4	573.2	322.4	552.9	395.5
3	97.2	485.9	498.9	343.1	414.0	122.4	775.5	529.4	349.4	552.9	439.7
4	131.2	....	112.6	608.5	412.3	880.5	610.3	624.1	307.9	544.2	370.6
5	136.1	449.9	415.9	644.2	476.4	644.0	283.7	498.9	277.3	468.0	....
6	98.4	467.7	400.3	485.2	438.1	642.2	666.5	552.9	280.4	552.9	397.0
7	97.2	465.6	460.5	801.8	417.5	552.9	602.8	523.8	328.9	514.3	446.4
8	94.9	536.5	203.4	518.4	472.6	742.1	599.2	642.3	290.0	525.7	463.9
9	121.3	460.5	382.1	754.4	446.4	515.0	527.4	567.5	281.9	429.4	415.8
10	137.5	490.4	474.6	608.5	....	781.5	610.3	608.5	309.5	463.9	414.0
11	....	472.8	....	....	....	....	....	527.5	....	....	426.1
12	....	....	....	....	....	....	....	498.9	....	....	....
Average	115.0	484.5	370.6	566.7	439.0	687.6	571.9	558.8	305.2	509.9	420.7
Percentage Mean Divergence from Average	13.7	5.2	22.9	20.5	6.1	2.8	15.1	7.1	6.6	7.1	5.2
Brinell Number.	217	274	231	180	226	142	168	147	191	158	202

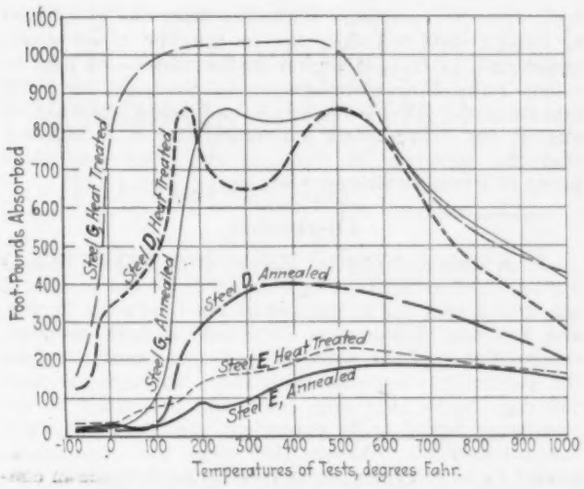


Fig. 2—Results Obtained on Three Plain Carbon Steels —G of 0.17 Per Cent Carbon, D of 0.36 Per Cent and E of 0.83 Per Cent

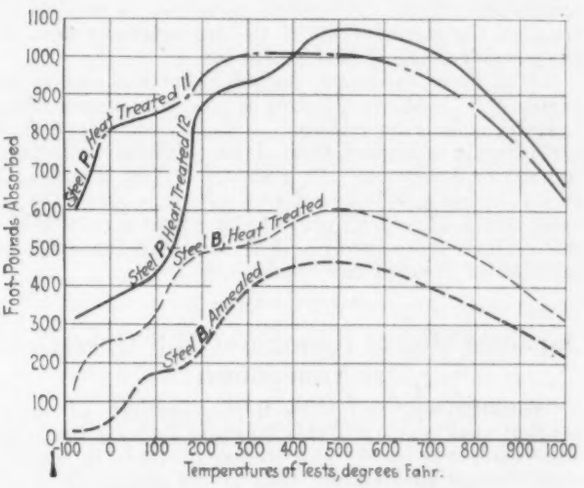

Foot-Pounds Absorbed
Temperatures of Tests, degrees Fahr.
Steel P, Heat Treated 11
Steel P, Heat Treated 12
Steel B, Heat Treated
Steel B, Annealed

Fig. 3—Medium Carbon Nickel Structural Steel B Compared with Medium Carbon Nickel-Chromium Structural Steel P, Both Steels Being Used for Gun Forgings

A few steels have been selected for particular attention when grouped for comparison in similar classes, or as applicable to similar purposes.

Fig. 2 gives a graphic representation of the results obtained on three plain carbon steels (Steels G, D and E of the previous investigation). The test results are from the material in both the annealed and heat treated conditions. Heat treatment of Steels G, D and E were as follows:

Anneal: Steel G, at 1697 deg. Fahr.; Steel D, at 1652 deg.; Steel E, at 1553 deg.

Heat Treatment: Steel G, heated to 1652 deg. Fahr., held one hour, quenched in oil; reheated to 1400 deg.; held one hour, quenched in oil; drawn at 500 deg. one hour, cooled in air. Steel D, heated to 1562 deg., held one hour, quenched in water; drawn at 1112 deg., held one hour, cooled in water. Steel E, heated to 1472 deg., held one hour, quenched in oil; drawn at 842 deg., held one hour, cooled in air.

Carbon contents were 0.17, 0.36 and 0.83 per cent. At a temperature of zero and lower, there is practically no difference in resistance to impact, when these steels are in the annealed condition. At a temperature of 100 deg. Fahr., the low carbon steel has a resistance to impact at least three times that of the 0.83 per cent carbon steel. At a temperature of 200 deg., the low carbon steel has a resistance to impact nine times that of the 0.83 per cent carbon steel. The very sudden and rapid increase in resistance to impact, in both the low and medium carbon steels in the annealed condition, occurs in the temperature range 100 to 200 deg.

In considering the heat treated condition, it may be remarked that the low carbon steel had received a treatment corresponding to that received by the core of a case hardened article; the medium carbon steel, a quench and a draw such as would be given when the material is used for structural parts. Comparing Steel G, the low carbon steel, in the heat treated condition, with the same steel in the annealed condition, it will be observed that the sudden rise in resistance to impact occurs in the temperature range—80 deg. to 0 deg. Fahr. when the material is heat treated, whereas the rise occurred in the range 100 deg. to 200 deg. Fahr. when the steel was in the annealed condition. Similarly, the great rise in resistance to impact in the medium carbon steel occurs in a very much lower temperature range when the steel is heat treated than when the same material is in the annealed condition.

Although many comparisons can be drawn from this group of curves, one outstanding feature is evident, particularly in the medium carbon steel. The tensile properties of this steel in the annealed and heat treated states were as follows:

	Yield Point, in Lb. Per Sq. In.	Tensile Strength in Lb. Per Sq. In.	Elongation in 2 In. Per Cent	Reduction of Area Per Cent
Annealed	35,500	71,500	25.6	39.2
Heat treated....	47,500	81,650	26.0	60.6

Although heat treatment has not materially increased the tensile properties of the medium carbon steel, its resistance to impact at 100 deg. Fahr. has been raised more than ten times.

On Fig. 3 are grouped a medium carbon nickel structural steel (B) and a medium carbon nickel-chromium structural steel (P). Since steels of both of these compositions have been employed in the manufacture of gun forgings and other ordnance, they are of particular interest. The nickel-chromium steel, represented by the two upper curves on the graphs, was subjected to two heat treatments identical in every respect, with the exception of the rate of cooling from the final tempering or drawing operation, one set of test bars being quenched in water from the drawing

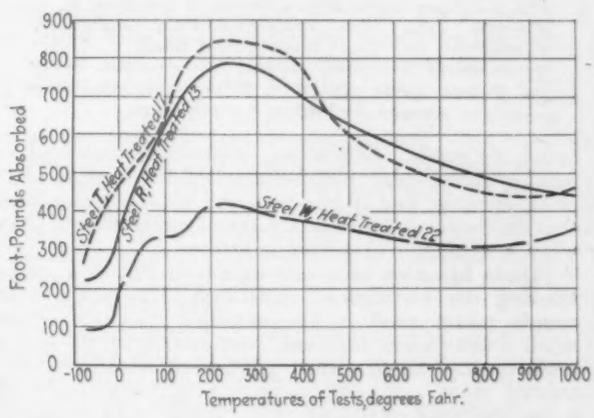

Foot-Pounds Absorbed
Temperatures of Tests, degrees Fahr.
Steel T, Heat Treated 17
Steel R, Heat Treated 13
Steel W, Heat Treated 22

Fig. 4—Results From Three Case-Hardening Steels After Carburizing Operation Followed by a Single Quench

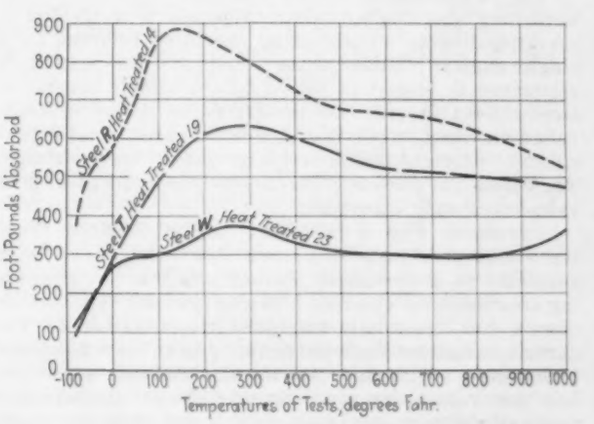

Foot-Pounds Absorbed
Temperatures of Tests, degrees Fahr.
Steel R, Heat Treated 14
Steel R, Heat Treated 19
Steel T, Heat Treated 18
Steel W, Heat Treated 23

Fig. 5—Compared With Fig. 4, This Shows the Effect of a Double Quench After Carburizing the Same Three Case-Hardening Steels

temperature and the other set being cooled in the furnace.

The tensile properties after heat treatments (the nickel-chromium steel having been slowly cooled from the drawing heat) were as follows:

	Yield Point, in Lb. Per Sq. In.	Tensile Strength in Lb. Per Sq. In.	Elongation in 2 In. Per Cent	Reduction of Area Per Cent
Nickel steel.....	77,650	99,350	22.8	58.1
Nickel-chromium steel	87,350	100,000	24.3	67.7

Resistance to impact of the nickel-chromium steel throughout all temperature ranges is superior to that of the nickel steel. When the nickel-chromium steel is quenched from the final drawing operation, the resistance to impact in the lower temperature ranges is decidedly increased. It has been the practice in this country to employ a plain nickel steel in the manufacture of gun forgings, whereas certain foreign countries have made extensive use of nickel-chromium alloy steels.

Work at Watertown Arsenal has clearly demonstrated that nickel-chromium steels give satisfactory results when employed in gun forgings—if the steel has been properly made. With any given tensile property, the resistance to impact, particularly in the lower temperature ranges, is decidedly higher for nickel-

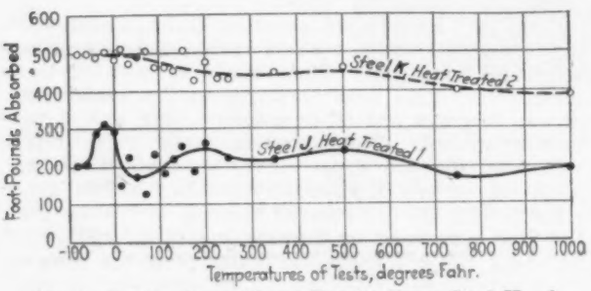


Fig. 6—Upper Curve Shows Results From Steel K, of Stainless Type, With Resistance Fully Maintained Throughout the Low Temperature Range. Lower Curve—Steel J—Shows Violent Fluctuations Below the Boiling Point of Water, With Substantial Uniformity at Higher Temperatures

chromium steels. Difficulties, however, encountered in making satisfactory nickel-chromium forgings are not inconsiderable, and it has been the general experience that the losses in process are considerably higher than when a straight nickel steel is utilized.

There has also been introduced on Fig. 3 a curve showing the variation of resistance to impact of the simple nickel steel in the annealed condition. The much lower values obtained, particularly in the lower temperature ranges, when contrasted with the heat treated state, are to be noted. At a temperature of 0 deg. the heat treatment given to this steel increased its resistance to impact approximately five times. At a temperature of 200 deg. Fahr. the resistance to impact was increased approximately twice.

Fig. 4 represents results obtained from three case hardening steels after being subjected to a treatment corresponding to a carburizing operation followed by a single quench. Under these conditions the maximum resistance to impact is shown by the simple chromium steel. Next in order of impact value is the chrome-vanadium steel, while the chromium-nickel steel is decidedly inferior, particularly at lower temperatures. The chromium steel and the chrome-vanadium steel give values not very divergent.

Curves in Fig. 5 represent results obtained from the steels previously discussed, after they have been subjected to a treatment corresponding to a carburizing treatment followed by a double quench. The double quench has materially improved the behavior of the chrome-vanadium steel, particularly in the low temperature range. Although the nickel-chromium steel has had its values improved in the lower temperature range, the chrome-vanadium steel is still decidedly superior.

As a matter of interest, Fig. 6 is also introduced, on which the results obtained from a steel of the "stainless" type are plotted. With this steel the resistance to impact does not decrease in the low temperature range and, in fact, is higher in the range—80 deg. to 0 deg. Fahr. than elsewhere on the temperature scale investigated. This behavior is in marked contrast to any of the other steels examined, and it is believed that this property in steels of this type may later prove of great service.

Discussion

H. J. French, physicist Bureau of Standards, Washington, pointed out that in tests made at the Bureau it was found that the properties of steel between 70 deg. and 850 deg. Fahr, were functions of both chemical composition and the form of heat treatment to which the particular steel was subjected. Through the next 250 deg. up to 1100 deg. Fahr. the properties of the steel were found to be dependent almost wholly upon the composition. Above 1100 deg. the composition proved to be of even greater relative importance in connection with the physical properties. These deductions were made as a result of 30 series of tests ranging from 70 deg. to 1100 deg. Fahr.

Chromium may be said to be a key element in high temperature work. It appears to stiffen as well as to toughen the metal at all of the temperatures used in the general range of heat treatment.

It is most important for designers and others to realize fully that the behavior of steel at common room temperatures is no criterion as to its behavior with a considerable departure from those temperatures either upward or downward. As a matter of fact, a series of steels having a definite order of values or strengths at room temperature may prove to have even a reverse order at high temperature. It is rare that the order is maintained through any considerable range.

Japanese Orders Help Sheet Mill Operations at Youngstown

YOUNGSTOWN, Oct. 30.—Representatives of independent steel makers in this territory indicate that the steel market is quiet, with incoming orders in insufficient volume to maintain the current operating level. Some improvement is noted, though, in the demand for the lighter steel products, except sheets. Makers are not expected to open their books on 1924 business until the latter part of November, or some time in December.

Virtually all district sheet makers participated in Japanese business placed recently, which while not profitable, nevertheless keeps rolling mills active and workmen employed. The Trumbull Steel Co. is reported to have shared somewhat liberally in this distribution, and has been enabled in consequence to operate its sheet mill department at a high average rate.

New business in recent weeks has been in better volume than during the corresponding period in September, while bookings the last half of October exceeded those in the first half. The improvement, however, has not yet brought new business to the level of shipments, indicating a further decline in operating rates unless orders improve.

Japanese requirements have been largely for the lighter steel products, such as sheets, bars and light structural shapes.

Receding mill operations reflect the quietness in the finished steel markets. With the independents, production is not averaging above 70 per cent, while the Carnegie Steel Co. is operating its district plants around 85 per cent.

Completed Federal highway projects in the United States have increased from 12½ miles to 26,536 miles, with an additional 14,000 miles under construction and a further 6000 miles approved for construction, since 1918, according to Roy D. Chapin, chairman of the board of the Hudson Motor Car Co., in an address before the Motor and Accessory Manufacturers Association in Boston. Adding the efforts of States and counties, the total mileage of improved highway in the United States reaches 350,000, or about one-eighth of the aggregate road mileage of the country.

Utilization of Blast Furnace Slag for Construction Purposes

BY C. L. MC KENZIE

C. L. McKENZIE is a native of Montrose, Pa., and was graduated from Lehigh University in 1893. His early work was on land, mine, highway and railroad surveying, planning maps and construction. In 1895 he associated with the Shiffler Bridge Co. and three years later was made assistant general manager. In the following year he became assistant to the Pittsburgh manager of the American Bridge Co. Since 1901 he has been president of the Pittsburgh Construction Co. He was made manager and treasurer of the Duquesne Slag Products Co. In 1906 and in recent years has been president.

AS the total quantity of pig iron produced annually in the United States is nearly 40,000,000 tons, it is closely approximate to estimate the amount of blast furnace slag produced in a year at 20,000,000 tons. This 20,000,000 tons must be taken away or the furnaces must stop making pig iron.

If put into the form of granulated slag and piled on the space occupied by the Woolworth Building (nearly an acre), this quantity would reach up 3 1/3 miles, or about 22 times as high as the Woolworth Tower. Spread out level to a depth of 24 ft., it would cover 640 acres, or one square mile. Since, with rare exceptions, no low lying waste ground is available close to the furnaces, it follows that to dispose of the material in fills it would either have to be transported considerable distances, or piled up on ground already at usable levels.

Slag is the second greatest product of a blast furnace. Without questioning that the purpose of furnace operation is to turn out good pig iron—and plenty of it—it is suggested seriously that it will pay to think also of the value of this second product. Much can be done to help toward a continued and more rapid increase in the quantity used commercially as a structural material of value, rather than continue to treat it as a waste to be handled at continually growing cost.

Prior to the beginning of the present century, only insignificant quantities of blast furnace slag were used in construction. In eastern Pennsylvania, and occasionally elsewhere, as far back as 1880, small quantities were used in unimportant concrete construction and, of course, it was used in crude form near the furnaces to make paths and driveways, just as any handy waste material would be used. Some of these roads remained long years afterward to prove the durability of slag as a road-making material.

About 1895 to 1905 many steel companies began to use it in large quantities in concrete. It was used in about every type of construction for which concrete can be used; heavy and light mass foundations, including those under blast furnaces; walls and floor slabs, sewer pipes, coke ovens; stacks, including one 290 ft. high; water tanks and dams, exposed to dry, hot atmosphere and to alternate drying and wetting, or to alternate boiling and cold water, and to all weather conditions with alternate freezing and thawing.

Commercial slag plant equipment includes magnetic separators. With these, and by hand, there is a recovery of the scrap iron, or "cinder scrap," amounting in some cases to as much as 2 per cent and on the average to at least ½ per cent of the weight of the slag. At present prices this would mean a saving to the furnace companies of more than $500,000 annually.

At present the yearly output (all used) of these "commercial" slag plants in the United States is about 7,000,000 tons. Of this, the subdivision (varying from year to year) will average about as follows:

	Per Cent
Road and street building (other than concrete)	45
Railroad ballast	25
Aggregate in concrete	25
Roofing	1
Miscellaneous, cement concrete blocks, bricks, etc.	4

In the district within shipping distance of the slag crushing and screening plants, the amount of cement concrete placed each year will average at least 40,000,000 cu. yd. Air-cooled blast furnace slag is used as the aggregate in about 1,750,000 cu. yd. of this. In the twenty years of development about 20,000,000 cu. yd. of concrete have been built, using air-cooled blast furnace slag as the aggregate, with practically a total absence of reports of failure.

As an illustration of heavy service, the Curry Hollow arch on the Monongahela Southern Railroad contains 23,000 cu. yd. of concrete in the 50-ft. arch spans, on which there is a double-track railroad fill more than 100 ft. deep. Other structures on this industrial railroad line, in which slag was used as the aggregate in the concrete, amounted to 100,000 cu. yd., including one retaining wall about 50 ft. high. Slag concrete was used also in lining the 1800-ft. double-track tunnel.

Another use for which large quantities have been required is in railroad ballast. In 1920 the Slag Association compiled a list of 40 railroads, all of which were using more or less air-cooled blast furnace slag for ballast and at that time were consuming at an average of about 1,750,000 tons per annum.

In other classes of road building 3,000,000 and more tons is the ordinary present consumption. One comparatively new and little known type of bituminous slag paving (made of slag sand) has been used to cover the equivalent of 200 miles of improved 18-ft. highway in one county, and something over the equivalent of 400 miles of 18-ft. highway of this one class alone has been laid in the United States in the 6 or 7 years since it was introduced.

In the granulated form blast furnace slag finds less valuable—but still valuable—uses in several ways, most of which have not developed far, but promise much. One use that has been definitely worked out is in the manufacture of Portland cement, which requires in the established factories using it about 1,000,000 tons of granulated slag yearly. Its success here is no longer questioned. With the recent great increase in number of Portland cement manufacturing plants, and corresponding producing capacity, it may be a long time before a further great increase in consumption of slag for this purpose can be expected.

Probably another 1,000,000 tons is used to make driveways and back country roads, where traffic is not heavy and where lowest cost is essential, and for similar less important service. There is promise that successful building blocks and bricks can be made of granulated slag with an admixture of a small percentage of other materials. In a few years this line might use 1,000,000 tons of granulated slag, and within 10 or 15 years perhaps 2,000,000 tons or more.

It would thus appear that now (or within the near future) the commercial uses for blast furnace slag may consume one-half the production. What the total can become within the next ten years it would be venturesome to predict, but it is certain that it may be increased greatly and rapidly if its promotion and development be given sufficient forceful, carefully planned attention, with strong support from the furnace op-

erators, including active cooperation in maintaining a satisfactory and uniform character of slag.

One direction in which the furnace operators can help to make continually sure of avoiding complaints and objections to the use of slag is by rigidly insisting that ashes, coke dust, flue dust, sand, clay, stone screenings, coal dust and other refuse that accumulates around the furnaces shall be disposed of somewhere else than in the slag pit. Most of the waste materials mentioned are mineral and could cause little actual damage if mixed in with the slag. But they can cause immense damage and interference with the slag business when the inspector will not believe it possible to have good results with these foreign materials in. Especially would the engineer fear bad results.

Engineers also object to the lack of uniformity in the weight of the slag, due chiefly to the varying proportion of the "honeycomb" slag to the dense slag, free of gas pockets. Attention to the lesser operating details, such as the routine method of pouring the slag, and no doubt other small matters that can be discovered by observation—and that do not add real cost—will help to obviate this difficulty, and substantially reduce market resistance to the sale and use of blast furnace slag.

One danger lies in the possibility of changes in furnace practice, particularly in the direction of using a calcite flux exclusively in preference to a dolomitic limestone, or to mixing a small percentage of dolomite with the larger percentage of straight calcite. Furnaces in which the straight calcite stone is used produce a slag that tends to disintegrate on exposure to the air and cooling to the extent of one-third, even one-half or more, of its volume.

Practically it is impossible to use such a slag in a commercial way and it is fit only to be wasted. In granulated form, of course, a slag of this analysis is useful and perhaps for some purposes better than granulated slag from a furnace in which the flux used is dolomitic. But the commercial (or money) value of granulated slag is as yet insignificant even for the purpose for which it is actually used. The iron scrap salvage is also difficult or largely impossible when the slag is granulated. At present the greatest value is recovered from the slag in the hard, air-cooled form and the immediate possibilities of greatly increased use lie in this direction.

Can the operator afford to neglect these possibilities of the use of a substantial percentage of the total slag to be disposed of, by insisting on producing "limey" slag through the use of straight calcite flux? Practically, of course, it comes down to the question of whether the use of a certain percentage of dolomite or a dolomitic limestone really adds to the cost of operating the furnaces and to the corresponding cost of the pig iron. There seems to be a difference of opinion among blast furnace men on this point, but some have changed the flux from calcite to dolomitic limestone for the special purpose of guaranteeing usable slag for construction purposes. Some claim improved furnace operating results and lower cost resulting from mixing a percentage of dolomite with the calcite flux.

COL. T. C. DICKSON was a Texas candidate to West Point, from which he was graduated in 1892. His career includes five years in the manufacture, design and testing of small arms at Springfield Armory, three years in the manufacture of gun carriages at Rock Island Arsenal, four years as assistant to the chief-of-ordnance at Washington and four more as supervisor of tests at Sandy Hook Proving Ground, of which he later was given command. He was on the staff of Gen. George Goethals as inspector of shops in the construction of the Panama Canal. During the World War he was brigadier general and assistant to the chief of ordnance. Since that time he has been commanding officer of the Watertown Arsenal.

X-Ray Examination of Metals

BY COL. T. C. DICKSON

THE paper entitled "X-Ray Examination of Metals" was the only one which was neither preprinted nor offered in manuscript form. The author, Col. T. C. Dickson, commanding officer, Watertown Arsenal, Watertown, Mass., delivered an address on the subject which was largely an account of the work done at his plant in the development of this method of examining steel castings. A large number of reproductions of X-ray films were thrown upon the screen and explained by the speaker. He recounted the fact that a 300,000-volt apparatus was installed at the arsenal a few years ago, descriptions of which have already appeared in some of the technical journals recently. He recounted the method of application of the film and the Coolidge tube to various castings and stated that it had been possible to successfully make X-ray pictures of metal 1 in. in thickness after an exposure of 2 min., of metal 2 in. in thickness after an exposure of 5 min. and of metal 3 in. in thickness after an exposure of 30 min. This is regarded as the limit of this method of testing up to the present time.

The films which were displayed showed the results of the examination of various castings made at the arsenal, such as muzzle brakes, grousers for artillery purposes, caps for both 2000-lb. and 1100-lb. demolition bombs and other large castings. The reproductions showed how it has been possible to detect shrinkage cavities in all of these castings by means of the X-ray without destroying the casting, and also the detection of slag inclusions, blowholes and other defects. The method of procedure has been to produce one casting according to a molding practice which seemed the best for the casting and then to examine it with the X-ray. The result in each case has been the detection of defects which could be ascertained in no other manner. With this knowledge it has been possible to either change the method of molding or the gateing and heading of the casting, or also when necessary a redesigning of the pattern. It has even been possible to produce castings lighter in weight than had ordinarily been expected possible as a result of the X-ray examination. The results were pointed to as of extreme value to the work of the arsenal and applicable on a commercial scale in the foundry as well as in other phases of the metal industry.

Discussion by Dr. Ancel St. John

A brief discussion of the remarks of Colonel Dickson was contributed by Dr. Ancel St. John of the Union Carbide and Carbon Laboratories, Inc., Long Island City, N. Y. Doctor St. John corroborated many of the points illustrated by the speaker and then emphasized the fact that the use of the X-ray method of testing was not a question as to whether one could afford to install such a tool but whether one could afford not to make use of it. He believed from his own experience that the advantages, which it was possible to obtain and which had been clearly pointed out by the speaker, were such that the employment of such an apparatus could not be dispensed with by modern industry. Doctor

St. John believed that while the present limitations of equipment, which it is possible to obtain, were such as to prevent the examination of metal any thicker than 3 in., it would later be possible to obtain apparatus which would insure the examining on a commercial scale of objects at least 5 in. thick. The possibilities and advantages which would result from this realization were evident.

Recent Developments in Steel Forgings

BY JOHN L. COX

JOHN LYMAN COX, was born in Philadelphia, in 1866 but soon moved to Orange, N. J. He entered Stevens Institute of Technology and was graduated with honors in 1887 as mechanical engineer. In 1888 he joined the Midvale Steel Co. and has since been connected with the plant at Nicetown, having had charge of the forge, armor, projectile and research departments. He has taken out a number of patents on improvements in the manufacture of steel, armor and projectiles. At present he is assistant to the president of the Midvale company

WITHIN the past few years, there has been a revolution in the construction of power plants. The reciprocating engine of 10,000 hp. has given way to the steam turbine of 87,000 hp. The public service steam boiler of 350 lb. pressure, of which a few were built in 1922, is succeeded in 1923 by the boiler of 1200 lb. pressure. The 1500-lb. boiler is under consideration here, and an experimental boiler for 3200 lb. pressure is building in England. Such changes have required much consultation.

In many other directions units are being designed with parts exceptional in size or quality, which must be submitted to the steel manufacturer before confidence can be felt that they are procurable.

Again, a knowledge of the obtainable may make possible designs employing to advantage steel forgings in place of the more commonly used steel castings in parts of great size and weight, or encourage the growing tendency to employ the alloy steels in place of carbon steel in highly stressed forgings much larger than those in which their use has been customary, or influence a decision in favor of substituting hardened and ground forged alloy steel for chilled cast iron in rolls for cold rolling metals.

Alloy Steel Forgings

By the companies manufacturing armor, chrome-nickel steel has for many years been made into plates of great size, and most elaborate heat treatments have been devised to produce in them the qualities necessary for successful ballistic test. For this use, advantage has been taken of the exceptional toughness of this alloy steel rather than its possibilities for high tension test figures, which are those largely employed in the manufacture of parts for automotive engines. Today, industry is availing itself of the widely variable properties of this alloy, or similar alloys, in forgings of considerable size.

A notable instance of this is in the recent introduction of the use of chrome-nickel steel for columns of hydraulic presses, where carbon steel proved too weak and it was impossible to increase the diameters. Such columns are in successful operation today as large as 24 in. in diameter and over 36 ft. long. A treatment giving about 115,000 lb. per sq. in. tensile strength, 85,000 lb. per sq. in. yield point, 21 per cent extension in 2 in. and 55 per cent reduction of area, has answered well.

Chrome-nickel and chrome-vanadium steels find employment in a recently constructed 32-in. built-up container for an extrusion press. The liner is a forging of chrome-vanadium steel fully heat-treated and moderately drawn back. The inner member of the container is of chrome-vanadium steel of 110,000 lb. yield point and the outer member of chrome-nickel steel of 130,000 lb. yield point, the several pieces assembled under shrinkage similarly to a built-up gun, so that when the appliance is working under full pressure of 47,400 lb. per sq. in. no part bears over 61,000 lb. per sq. in. fibre stress.

Hardened Steel Rolls

Another interesting field in an active stage of development is the manufacture of hardened steel rolls. Formerly, nearly all cold rolling of strip and sheet metal was done with chilled iron rolls. In steadily increasing volume these are being replaced by heat-treated, hardened, slightly drawn, ground and polished rolls of alloy steel, usually chromium, chrome-vanadium, chrome-molybdenum, chrome-vanadium-molybdenum, or chrome-tungsten-vanadium. Fully hardened rolls of these alloys may be made much harder than chilled iron rolls; the hardness runs in the neighborhood of 110 to 115 scleroscope. They take a much higher finish, produce a correspondingly better surface on the product, and are reasonably long lived if treated properly, as they deserve to be, for they are among the highest expressions of the steel maker's art.

Today rolls about 25 in. in diameter by 40 in. in length of body are readily supplied in the hardest grades, and rolls as large as 28 in. by 120 in. can be furnished with scleroscope readings of about 80, or over. No doubt, in time, skill and equipment will be available to produce these large rolls with a scleroscope hardness of over 100.

In some cases, remarkable results have been secured in rolling hard wire by the use of properly designed rolls of high-speed steel. Though not so hard by the scleroscope as the other type, Brinell readings are disproportionately high, and the metal of the roll does not indent and groove as readily as does the harder metal of the usual compositions.

Crankshafts

While no new principles have been developed in the manufacture of crankshafts of which I am aware, their production has been much facilitated by a new machine tool invented in Denmark. It consists of two opposed milling heads on horizontal shafts carried by housings, each with three adjustments and feeds at right angles to each other. Between them, over a pit, is a driven table provided with vise jaws adjustable toward each other and with reference to the axis of the table. Clamped between these jaws in a vertical position, adjusted properly with reference to their axes, the pins and webs of a crankshaft can be machined all over by the revolving cutters controlled by the feeds provided by the housings or by the revolution of the table. There results a great economy of time in the machining.

Large Hollow Drawn Forgings

In this field there have been very interesting developments both as regards size and character of forgings.

Recently there have been devised means for increasing the yield of gasoline from crude oil by the application of cracking methods. Depending upon the original character of the oil, this increase may be as much as 13 fold. The oil is heated to about 875 deg. Fahr. under 500 to 600 lb. pressure while circulating through tubes in a furnace, and flows to a large insulated cylinder where the completion of the cracking operation takes place. This cylinder, or reaction chamber, must stand heat, pressure, corrosion by sulphur in the oil, and be absolutely leak proof, for the gasoline under high pressure is well above its ignition point. The use of forged steel cylinders for this purpose has met with signal success.

I have alluded to the high pressure carried by the latest boilers. A Babcock & Wilcox boiler building for the new Weymouth Station of the Edison Illuminating Co. of Boston has approximately 19,743 sq. ft. of heating surface and will furnish about 110,000 lb. of steam per hour at a maximum pressure of 1200 lb. per sq. in. The cross drum of this boiler is a forged steel cylinder 48 in. inside diameter, 56½ in. outside diameter and 34 ft. total length over the ends, which are closed in to take a 12-in. by 16-in. manhole cover. This is one of the largest hollow forgings ever made; the forged weight is 162,000 lb., requiring an ingot of 262,000 lb. to allow for scrap and losses. The billet was cut hot from a 78-in. octagon ingot, was stood on end and upset to about 96 in. in diameter, had a 23½-in. core removed with a hollow punch, was expanded to about 50 in. in inside diameter, drawn on a mandrel to 45 in. inside diameter, 58½ in. outside diameter, annealed, tested, machined inside and out, and after closing-in is to be reannealed, have the throat machined to 11¾ in. inside diameter and the exterior of the head trued up.

Large Solid Forgings

So far as I am aware, with the single exception of the new armor plate press at the idle naval armor plant at Charleston, W. Va., there has been no very large forging press built in the United States for a number of years past, and the agreement for the limitation of armament, by practically ending for 10 years the manufacture of armor plate and heavy guns, makes improbable any increase of their number in the immediate future, but this lack of material progress has been offset by a great increase in manipulative skill, so that today it is possible to handle large masses and produce forgings of unprecedented dimensions with the equipment at hand.

Experience has shown, both in England and the United States, that solid forgings of large diameter, even of soft steel, may contain internal transverse cracks cutting across the axis, and sometimes running to within a few inches of the surface. Such forgings might drop in two in the lathe when deeply turned, although apparently perfectly sound had less metal been removed. If proper precautions be taken in casting, handling, forging and treatment, such cracks are not produced, but as a check upon the makers the most enlightened buyers of such large forgings are today requiring the drilling of an axial hole in diameter sufficient to permit the introduction of a bore searcher (2 in. is about the minimum diameter) by which the interior surface of the mass can be easily viewed and its soundness verified. This should be made a regular requirement, both for the buyer's and the maker's protection. No reputable maker would wittingly send out such a defective forging, but if the buyer will not authorize boring the piece he has only the reputation of the maker as a guaranty of its soundness, unless magnetic or X-ray testing can be developed to include such sizes.

From our early childhood, most of us have been familiar with a toy called the gyroscope, but it remained for Elmer G. Sperry of New York to make practical use of its uncanny powers. He has applied them in many different and most ingenious ways, one of which is of interest to us. He has produced gyroscopes of great proportions which are used to stabilize vessels, damping their tendency to roll. The rotating body is a steel flywheel, or rotor, of uniform density, accurately machined, most delicately balanced and mounted to revolve in a horizontal plane.

For a large vessel, such a rotor becomes of great size. Two such rotor disks measure 12 ft. 6⅝ in. in diameter by 16¾ in. thick each.

Shortly before the World War began, the Midvale Steel Co. began construction of a 20,000-ton forging press. The entablature was to consist of two main steel castings bolted together. After the first half of the entablature had been cast, various considerations led to a decision to substitute nickel steel forgings for the carbon steel castings first planned. The decision resulted in a modification of the design. No such design could have been confidently elaborated without knowledge that its main components were procurable. The forging was 12 ft. wide in the center, about 9 ft. wide at the ends, 4 ft. thick at the column bosses, decreasing to 1½ ft. thick at the center, and about 28 ft. overall. This forging weighed 289,000 lb. and was produced from an ingot of the general type of the 324,000 lb. ingot weighing 458,000 lb.

The press of which this forging is to form a part has not been completed. It awaits a call from engineers of the country for forgings larger than those entering into its own construction, since the treaty for the limitation of armament has for the present ended the work for which it was originally designed.

Discussion by T. D. Lynch*

It has been my pleasure to assist in some of the developments referred to by Mr. Cox in his interesting and timely paper, not as a producer of forgings, but as a consumer, interested in the development and manufacture of turbo generators and other important uses of forgings, with particular reference to high-speed turbine service.

The tendency in the development of turbine work has been for higher speed together with greater diameters, both of which are limiting factors in the production of large turbo units. The maximum stresses permissible for plain carbon steel have already been exceeded and the alloy steels are now being extensively used.

These developments have been along two general lines: First, that of increasing the size of the forgings and, second, that of increasing the quality of the forging.

Large forgings introduce many complications, one of which is that of internal stresses on account of the large mass involved. These stresses may be the result of piping or shrinkage cavities, segregation, cooling or heating of ingot, or the result of the forging operation.

One of the limiting features in these developments was that of available machinery, presses and equipment for handling and forging large masses. The fact that manufacturers are no longer making armor and ordnance renders available these mighty presses for this more useful commercial work which Mr. Cox has described, so that we are now able to use these presses for the production of these relatively new types of forging for commercial purposes.

One of the most important features connected with the success of this development, from our point of view, has been that of being permitted to test the material in a manner that is really representative. It has been our policy at all times to make tests on forgings in the direction of the maximum stresses to which these forgings are subjected in service. In turbo field development this makes it necessary to take the tests in a radial direction.

The point which Mr. Cox brings out of having all large forgings hollow bored is of the utmost importance and we are firmly of the opinion that all large massive forgings should be so bored and the centers thoroughly examined by some periscopic means to insure the absence of piping, cavities or cracks within the forging. It has come to our attention that the failure of large forgings often starts from the center and an examination of fractures has clearly shown that the starting nuclei of these failures were due to piping or

*Westinghouse Electric & Mfg. Co., Pittsburgh.

other flaws and it is surprising to realize how stresses are intensified about an apparently small defect.

Referring to the application of forgings for high steam pressure, I wish to call attention to the fact that steel under stress subjected to these high steam pressures such as 3200 lb. and correspondingly high temperatures will be very much reduced in tensile properties; for example, steel subjected to a temperature corresponding to 1500 lb. steam pressure is equal to approximately 600 deg. Fahr., while a pressure of 3200 lb. will correspond to practically a dark glowing heat and tests that have been conducted on the physical properties of steel at different temperatures are quite conclusive in that the physical properties fall off very rapidly after a temperature of approximately 600 deg. Fahr. has been reached, so that in going up to 3200 lb. pressure a temperature will be reached where all normal steels would lose perhaps 50 per cent of their value.

Mr. Cox's paper brings to us very clearly much of the important progress made in heavy commercial forgings in recent years, and it is very evident that equal care must be exercised in the manufacture and testing of forgings for commercial use as has been given to the manufacture of ordnance, and thus advance civilization and further the interests of mankind.

President Coolidge's Attitude Toward Industries of the Country

WASHINGTON, Oct. 30.—It was made clear at the White House last Friday that President Coolidge does not propose to call a general conference to discuss the industrial situation. The statement was made to refute reports to the effect that "key men" in the various industries would be summoned to Washington to confer with the President. It was made known that the Chief Executive does not believe that this step is necessary, as industrial leaders frequently are in Washington and call at the White House. The President makes inquiry of these leaders as to what the Government can do to assist the industrial situation and often asks the views of industrial leaders concerning current matters. It was also stated that there are times when the President is informed of petty persecutions by Government agents which injure industry and he generally takes such information under advisement. President Coolidge has made particular effort to acquaint himself with conditions in all lines of industry by consulting with representative men.

Detroit Foundrymen Discuss Pig Iron Quality and Cupola Practice

Following a dinner and entertainment in the Adams room of the Hotel Tuller the Detroit Foundrymen's Association listened to an address, "The Blast Furnace in Relation to the Cupola," by E. J. Lowry, metallurgist Hickman-Williams & Co., Chicago.

The speaker brought out the difference in irons made in a coke furnace and a charcoal furnace. The subject was treated from the angles of the relation in the designs of the two types of furnaces, their respective burdens and the effect of the two classes of fuels upon the resulting product through their effect in the reduction of the ores and scrap used in the stacks.

It was pointed out that due to the operating conditions in various furnaces the irons produced were not always of equal quality. The factors entering into the merits of pig iron were brought out in a discussion of blast volumes, temperatures, and pressures, together with the type of burdens used in the furnaces. These elements were shown to affect the total carbons contained in the resulting pig iron.

The quality of the pig iron produced was said to govern the amount of scrap which a cupola mixture could carry in melting iron for foundry use. By virtue of this fact some foundries melting one quality of iron could use more scrap in its charge in the cupola than another foundry using a different pig iron. The amount of scrap used in the foundry charges was also shown to be influenced by the analysis of the mixture entering the cupola.

The discussion of this latter phase brought out the question of silvery iron. The speaker argued that it was better to use this grade of iron in the lower silicon contents, 5 per cent to 8 per cent, than to use the higher silicon contents, 12 to 14 per cent. Illustrations were given to carry this point and it was generally agreed that such was the case.

Following the lecture discussions of the subject and of American foundry practice were entered into by the members and the speaker. The question of the control of carbon in the cupola was brought out by the speaker and debated by Messrs. Wilson, Rayner and Putman. It was finally concluded that the height of the coke bed in the cupola influenced the carbon pick-up and the iron. It was also shown that uniformity in the casting work in a foundry was more easily attainable by the use of a charge which equaled the "tap."

American Locomotives in France

According to an article by M. Lunier, inspector of equipment, Paris-Orleans Railroad, American-made locomotives have proved as successful in operation in France as in America. In 1921 this railroad placed in service 50 Pacific type locomotives equipped with superheaters. Comparing these with French locomotives, the author stated:

"These locomotives require very little maintenance and are greatly appreciated on this account by the engine drivers and master mechanics. Tests confirm the results obtained by American railroads with two-cylinder Pacific locomotives. This type promises excellent service on French roads. These locomotives are simpler and have a smaller resistance to movement than the four-cylinder compound locomotives. Their fuel consumption has been less, but this may be due to their higher superheat."

Increase in the Coal Rates Approved

WASHINGTON, Oct. 30.—Passing upon a complaint of the Pittsburgh Coal Producers' Association, the Interstate Commerce Commission in a opinion handed down last Thursday held that rates of soft coal made by the West Virginia Railroad Commission in comparison with those of the Panhandle part of the Pennsylvania system should be increased 6 cents a ton while 6c. and 7c. should be taken from many interstate rates. The association complained that rates from mines in Allegheny and Washington counties served by the Panhandle to points in West Virginia were unjust and unreasonable and to the advantage of mines in Ohio.

May Build Steel Plant

The award of a contract for the construction of a mile of dock bulkheads for the 1000-acre site recently purchased by the Jones & Laughlin Steel Corporation at Hammond, Ind., is interpreted as forecasting the possible early erection of a steel plant at that location. The building of the bulkheads is probably the initial move in the dredging of the Indiana Harbor ship canal to the steel plant site. The bulkheads are to be installed by the Great Lakes Dredge & Dock Co. of Chicago, at a cost of $250,000.

An arrangement has been effected whereby the Newport News Shipbuilding & Drydock Co., Newport News, Va., takes over the future hydraulic turbine business of the Wellman-Seaver-Morgan Co., Cleveland and Akron, Ohio, including patterns, data, patents and complete records.

Farm Implement Industry Not Well Sold

Price Level Ratio with Automobiles Not Understood by Farmer—Excess Capacity Has to Find Work—Greater Durability Reduces Later Sales

NATIONAL problems, both political and economic, that tend to affect industrial activities, as well as problems particularly affecting their own industry and that of the farmer, were discussed at the thirtieth annual convention of the National Association of Farm Implement Manufacturers, held at the Statler Hotel, Cleveland, Oct. 24 to 26. Various constructive suggestions were made for helping the industry. Figures were quoted to show that the farmers' financial condition is improving and politicians were blamed for circulating misleading information indicating that the farming industry is in a bad way. It was pointed out that farmers this year have been liberal buyers of all commodities except implements. Speakers urged a campaign of education to show the farmers that implement prices are reasonable, considering manufacturing costs, and to convince them of the need of keeping their equipment up to date in order to reduce the cost of farming.

Reducing Manufacturing Costs

J. B. Bartholomew, president Avery Co., Peoria, Ill., in his opening address as president of the association said that implement manufacturers have done about everything possible in the past few years to reduce manufacturing costs, but that little has been done in reducing selling costs. He referred to the economic condition of the farmer, high wages, high freight rates, the exodus from the farms and the sympathetic talk that has been going around for some time in behalf of the farmer, who he said must be placed on a more profitable basis. He declared that implement manufacturers should do something to help the farmers reduce their production costs by making better farm equipment, and that the farmers should reduce their labor and production costs by doing more work with mechanical equipment. In this connection he referred to a probable low fuel cost for the coming year, which would reduce the cost of operating farm tractors. Pointing to some figures indicating that the farmers are buying more automobiles than farm implements, he declared that the automobile is the first on the list of a farmer's requirements.

Increased Durability of Instruments

"Some Problems of the Manufacturer" was the subject of a paper prepared by Alexander Legge, president International Harvester Co., and read by C. A. Ranney of that company. Mr. Legge declared that one of the basic problems which farm equipment manufacturers have to face is excess factory capacity. When the acreage under cultivation was increasing, the demand for farm equipment was in excess of what can be hoped for with business on a mere replacement basis, which is all that now can be expected for some time. Furthermore, with men leaving the farms because they can earn more at other occupations, a shrinkage of farm population may be looked for. Implement manufacturers themselves have contributed to the reduced demand for farm machinery by changing from wood to steel construction and increasing its durability, the efficient usefulness of most implements being now double what it was 20 years ago. With present prices, the unit cost of farm implements will probably figure less today than in the old low-price days, when calculated on the life of the machine or the number of acres it tills.

"However much we may theorize or reason as to the causes leading up to the present situation," continued Mr. Legge, "nobody will dispute the fact that we cannot hope to employ profitably all the facilities now in existence for producing farm machinery, and that the idle expense or excess investment represented in capacity not needed is one of the serious problems of the manufacturer. No doubt some other use will be found for much of the shop capacity now standing idle. In fact, there is progress being made now in converting some of this capacity to other uses.

"Extreme fluctuations in demand for farm implements have doubtless contributed to the over-expansion of manufacturing facilities. We implement manufacturers have been all too keen to increase our facilities to a point where we could take care of maximum requirements of heavy buying years, ignoring the fact that these heavy buying periods are the exception rather than the rule. Another element which the implement manufacturer must consider in making plans for future trade is the part the automobile is taking in the economic life of the American farmer.

Relative Prices

"Perhaps the automobile manufacturer is doing a better job of selling than the implement manufacturer. At any rate, he has the decided advantage of having no past history to contend with in the matter of prices. In a recent publication a prominent automobile manufacturer made the proud boast that his particular make of automobile was now reduced in price to 20c. a lb. About that same time, the average wholesale price of farm machinery had advanced to a little over 10c. a lb. When we consider how largely both industries draw on the same source of raw material supply and compete in the same market for labor, it becomes a question of how it is going to be possible for the implement manufacturer, out of almost identically the same material, and with the same class of labor, to sell farm implements so far below the price that the same material and labor bring in the form of an automobile.

"It is my notion that widespread criticism of implement prices is not the fault of the farmer so much as of the implement manufacturer and dealer. Farmers as a class have not had experience in manufacturing and cannot be expected to know the relative manufacturing cost of a plow and an automobile. Being a newcomer in the field, the automobile never established low price levels during the days of low-cost production which the implement industry passed through a number of years ago. Naturally the farmer forms his opinion of our prices by comparing the figures of today with those prevailing 15 to 30 years ago. He has no such basis for comparison in the case of the automobile.

Influence of Labor Cost

"It is clearly the obligation of the implement manufacturer and retailer to give the farmers the essential facts as to the difference in price levels, and this should not be difficult to do. The cumulative labor content in every implement you gentlemen make is at least 80 per cent of the cost of the goods, and when you ask the farmer to compare the wage level that he has to pay for help on the farm with that of 20 years ago and apply the same ratio of increase to the 80 per cent labor content in the manufactured tool, you have fully accounted for the difference in price.

"We need to do a better job than in the past in presenting to the farmer the facts that determine our costs and prices, and in showing him the true relationship between our prices and those of the other commodities he buys. We must show him, as we can do, that we have no more control over the economic

factors that shape our costs and prices than he has over his own costs of production."

Foreign Trade in Implements

W. H. Stackhouse, general manager French & Hecht, Davenport, Iowa, in a paper on "Certain Aspects of Present Business Conditions," discussed foreign trade, wages, immigration, the railroads and other national problems. In referring to the foreign trade he said that, with the exception of England, the exchange against the American dollar is practiccally prohibitive in most European countries. "On the other hand," he said, "South America, and particularly the Argentine, with its far less unfavorable rate of exchange, is largely a buyer of finished or manufactured products, which makes it a particularly attractive market for the manufacturers of farm operating equipment to cultivate and secure as a permanent customer. During the first six months of this year our exports to Great Britain declined 7 per cent under the similar period of last year, while the value of our shipments to the Argentine showed an increase of 31 per cent, or approximately $14,000,000.

"It should be particularly encouraging to the farm implement industry to realize that exports of implements, in July this year, were over $5,600,000, the highest since February, 1921; and for the first seven months of the present year our implement exports were in excess of $28,000,000, or more than double those for the corresponding period of 1922. Again, the total exports of farm implements for the 12-month period ended June 30, 1923, amounted to $37,738,458, or nearly double those of the previous year.

"Department of Commerce statistics to the effect that, during the first six months of the present year, we exported $22,500,000 worth of agricultural machinery, including over 10,000 tractors. or a gain of 131 per cent over the similar period of the previous year, is particularly reassuring.

Farmers' Condition Not Desperate

"While the farmer is to some extent the victim of an unbalanced industrial situation, his condition, with the exception of the single crop or wheat farmer, is anything but desperate. The price of corn, oats, hogs and wheat are higher than they were a year ago, while the gross receipts of American farmers during this year will approximate $15,000,000,000, or $1,000,000,000 more than last year, and about $2,000,000,000 greater than in 1921. The Department of Agriculture shows that the composite production of all crops for 1923 will equal 97.4 per cent of the average for the 10-year period.

"Since 1920 Congress has created adequate credit facilities covering long periods for the farmers, who have availed themselves to the extent of many hundred millions of dollars, a substantial portion of which loans have been liquidated. Hence it seems that only the farmer who grows nothing but wheat, which approximates but 6 per cent of farm revenue, is seriously affected at this time, and it seems but common sense for all farmers to aim to balance production with demand, and prudently to diversify their crops rather than depend upon unsound and futile legislation, including governmental price fixing, as most economic ills are not susceptible to legislative correctives."

Railroads

Speaking of railroads Mr. Stackhouse mentioned their high taxes, meager net returns, great expenditures for equipment and improvements and threats of certain members of Congress to amend the transportation act, adding:

"It would seem the height of wisdom and prudence to discontinue railroad baiting, and instead to encourage railroad executives to solve their own problems, in a practical manner, and to operate their properties as economically as the burdens already inflicted upon them by politicians will permit, without further unnecessary governmental interference.

"One of the most irritating factors in dislocating the country's industrial equilibrium, is the weakness usually displayed by governmental agencies functioning in employment disputes; they usually ignoring entirely the equities involved, and instead proceeding along the lines of least resistance, arriving at a compromise which, besides being unfair, is extremely expensive to industry and to the general public.

A notable instance is the regrettable timidity, characteristic of professional politicians, displayed by the Federal Coal Commission. When attempting to handle the threatening bituminous coal strike, last year, it yielded weakly to every demand of the unions, including a continuance of war-time wages. A similar injustice recently was imposed on the public in the settlement of the anthracite miners' strike."

Selling the Industry

In a paper on "Our Public," Findley P. Mount, president Advance-Rumely Co., La Porte, Ind., including in "Our Public" not only the users of farm machinery but all those who benefit among the public at large, declared that the implement manufacturers are not using the daily press properly to advertise their wares. Comparing the farm implement with the automobile he pointed out that the press is sold on automobiles and no other industry in the world has ever had so much news publicity. The farmers' balance sheet shows that he was better able to buy in 1923 than in 1922 and that he has purchased liberally from every other industry except the farm implement industry. There may be many reasons for this but, in the speaker's opinion, one outstanding reason is that the farm implement industry has been content to sell itself and its product in a prosaic way to the users alone. The manufacturers have assumed that not only the farmer but the public realize the difference in farming with antiquated tools and with up-to-date tools, with inefficient machinery and with efficient machinery.

Without blaming the newspapers, the speaker said that whatever is lacking is chargeable to the implement manufacturers, in their failure to comprehend the magnitude of their public and to use their best efforts to sell the public on their idea. The message to put across is the message of better and more profitable farming. It is the message of producing two blades of grass at less expense than one was produced before. It is the message of helping to solve the cotton problem of the South, the wheat problem of the West, the corn problem of the corn belt and other problems of the farmer. He declared that the wider use of more up-to-date farm equipment would increase the yield, lower the cost and turn losses into profits.

What Has to Be Made Up

"It is estimated that the farmers are today more than $1,000,000,000 short of their normal purchases of farm machinery, while the Department of Agriculture estimates that from $8,000,000,000 to $12,000,000,000 worth of new equipment is needed on the farm in the next 10 years to equip and to replace a large percentage of worn-out and repaired implements that are losing more than the cost of a new set of tools, through loss of time and efficiency. If this is true, is there any wonder why there are complaints that the cost of production is so high that there is no profit in farming?"

The speaker pointed out that invidious comparisons have been made between the prices of farm equipment and automobiles, which were unfair. Politicians have been preaching to the farmer and the public that farming is a totally hopeless enterprise; the nation's agricultural balance sheet proves the falsity of this assertion. These misleading statements have created a feeling in the public mind against the stability and security of agriculture. Individual efforts have been made to correct these false impressions but, because the effort was individual, it could not hope for real success.

"It takes organized effort," said Mr. Mount, "a well directed campaign, to set right before the public what has so often been set wrong; a campaign backed by the whole industry, calling to its support all the talent of the industry, and having all the effort that the national organization can put behind it; not a

campaign to promote the use of this or that particular tool; not a tractor vs. horse campaign; not a campaign to sell machinery at all, but a campaign to sell the public the industry itself, the good that it is doing, the boundless increase of good that it can do; the right kind of help and cooperation the farmer needs; a campaign of enlightenment, if you please, which will give the farm equipment industry its true and rightful position in the world of business economy."

Bureau of Research Created

In line with suggestions made in Mr. Mount's paper, the association voted to establish a bureau of research for collecting, tabulating and disseminating information relating to farming and the farm equipment industry. This bureau will be located at the general offices in Chicago. Its general policies will be determined by the executive committee, together with an advisory committee composed of advertising managers of members of the association.

Resolutions adopted by the association included the following:

Declaring that it is contrary to public interests for the Government to engage in any form of private business, including any plan which provides for fixing or guaranteeing selling prices by the Government, or buying and selling commodities; favoring the passage of laws that will stimulate the use of United States ships for carrying our products to other parts of the world and favoring the repeal of the La Follette seamen's act; opposing the passage of a soldiers' bonus bill; favoring the repeal of the Adamson act; deploring the adjustment of the miners' wage scale guaranteeing a further advance, thereby postponing a proper and fair adjustment that is bound to come; indorsing the open shop; approving the elimination and standardization work of the Department of Commerce Division of Simplified Practice; opposing the use of convicts for the manufacture of farm equipment; favoring the repeal of burdensome war taxes as far as practicable, but especially all taxes on commercial paper, telephone and telegram messages; declaring that the transportation act of 1920 should not be disturbed, but should be given a fair trial under business conditions more nearly normal than have prevailed since the passage of the act; urging Congress to repeal the present immigration act and replace it with a law permitting the entrance of any foreign national whom we can readily assimilate and who, in addition to being in sound health, possesses the fundamental attributes of character and industry.

H. J. Hirshheimer, La Crosse Plow Co., La Crosse, Wis., was elected president for the ensuing year and Findley P. Mount, president Advance-Rumely Co., La Porte, Ind., was elected chairman of the executive committee.

BIDS ON NAVAL VESSELS

Tenders Received from 17 Companies—Other Sales to Be Held Soon

WASHINGTON, Oct. 25.—Bids for six vessels on the ways at navy yards, which are to be scrapped in accordance with the Treaty Limiting Naval Armament, were opened at the Navy Department Oct. 25. Bids were received from seventeen firms. Bids will be submitted to Admiral Potter, chief of the Bureau of Supplies and Accounts, and will be carefully considered by the Navy Department before making the awards.

The bids received were as follows:

"As Is" (To be Scrapped by the Purchasers)

Merritt, Chapman & Scott Corporation, New York.
- United States $10,000.00
- Constitution 5,000.00

Hyman, Michaels Co., Chicago.
- Indiana $31,189.00
- South Dakota 35,391.00
- United States 45,640.00
- Constitution 41,992.00
- North Carolina 24,554.00
- Alternate bid on all five ships..... 186,566.50

Continental Machinery Co., New York.
- Indiana and South Dakota (both vessels) $110,000.00

N. Block & Co., Norfolk, Va.
- North Carolina $42,365.00

Mayer Pollock, Pottstown, Pa.
- United States $51,666.00
- Constitution 44,444.00

Larner Rosenthal, Oakland, Cal.
- Montana $47,110.00

Boston Iron & Metal Co., Baltimore.
- North Carolina $15,192.00

J. Goldberg & Sons, Kansas City, Mo.
- United States $26,552.00

Bond Brothers Co., San Francisco.
- Montana $3,010.00

Hickman, Williams & Co., Philadelphia.
- United States and Constitution (both vessels) $114,190.40

E. B. Leaf Co., Philadelphia.
- United States $52,111.00
- Constitution 52,222.00
- For two vessels combined..... 109,333.00

Charles S. Hoffman and G. Weissbaum, San Francisco (Bid presented by Gates & Mather, attorneys, Washington).
- Montana $28,962.40

Fred W. Erickson, New York.
- United States $37,500.00
- Constitution 28,000.00
- For both vessels 70,000.00

Columbia Steel Corporation, San Francisco.
- Montana $44,400.00

Other Bids Received

M. Samuel & Sons, Brooklyn.
- Indiana and South Dakota, $2.37 per gross ton or..... $23,700.00 each
- United States and Constitution, $6.37 per gross ton, or..... 44,590.00 each
- North Carolina, as is..... 3,515.50

For material in the Indiana and South Dakota, $11.50 per gross ton, material to be cut by Government to charging box size.

For material in the United States and Constitution, $12.75 per gross ton, material to be cut by Government to charging box size.

David Kaufman & Son Co., Elizabeth, N. J.
Material to be cut by Government to shipping size.
- Indiana $64,267.00
- South Dakota 70,733.00

Steel Scrap Corporation, Philadelphia.
Material to be cut by the Government.
- Indiana, cut to shipping size, $9.51 per gross ton.....Total $92,969.76
- Cut to charging size, $13.06 per gross ton.....Total 127,674.56
- South Dakota, cut to shipping size, $9.51 per gross ton.....Total 103,107.42
- Cut to charging box size, $13.06 per gross ton.....Total 141,596.52
- United States, cut to shipping size, $13.26 per gross ton.....Total 84,996.60
- Cut to charging box size, $14.26 per gross ton.....Total 91,406.60
- Constitution, cut to shipping size, $13.26 per gross ton.....Total 92,024.40
- Cut to charging box size, $14.26 per gross ton.....Total 98,964.40
- North Carolina, cut to shipping size, $8.21 per gross ton.....Total 81,508.88
- Cut to charging box size, $13.51 per gross ton.....Total 134,127.28

The above figures are given for information and are subject to verification and consideration by the Department.

Captain Bonnaffon, in charge of the sale, said:

"In the next sale, on Nov. 1, we will sell the old battleships New Hampshire and Louisiana, at Philadelphia; the Georgia and Rhode Island, at Mare Island, and the Connecticut, at Puget Sound, Wash. The battleship Iowa and the battlecruisers Constellation and Ranger, at the Newport News Shipbuilding & Drydock Co., Newport News, Va., and the battleship Massachusetts, at the Bethlehem Shipbuilding Corporation's plant at Fore River, Mass., will be sold on Nov. 8. The final sale, Nov. 30, will include the old battleships Michigan, Kansas and Minnesota at Philadelphia; the Vermont and Nebraska at Mare Island and the Delaware at Boston."

Metal Working Production Problems

Economics of Standard Machine Tools, Developments in Grinding and Piecework Wage Payments Feature Meeting of Automobile Industry

THE second annual production meeting of the Society of Automotive Engineers was held at the Hotel Winton, Cleveland, Thursday and Friday, Oct. 25 and 26, with an attendance of over 300 composed largely of men who design and those who manufacture automobiles. The first production meeting was held in Detroit a year ago. The aim of these meetings is to bring together the automotive engineers and factory production executives and to discuss problems that are more or less in common and to promote cooperation between the two lines of activity.

The program was arranged in four sessions with different general subjects arranged for each session. There were machine tool, factory managers and scientific management sessions, and the last session was a general one. In the machine tool and general sessions speakers discussed some of the recent developments in machine tools and processes for production work and showed how these machines fit into production plans. During the factory managing session papers were presented on the group plan of wage payment, handling labor and the use of conveyor systems. While little discussion followed the papers, the audience submitted written questions to each speaker at the close of his paper, and the large number of questions indicated keen interest taken in the various subjects.

During the discussions it was pointed out that with improved methods automobile parts of longer life are being produced, and a prominent statistician was quoted as saying that the average life of an automobile has increased from 5 to 7 years. A suggestion was made to the members that in connection with the production meetings the Society of Automotive Engineers provide an operating exhibit of machinery used in making automobile parts. This will be limited to new types of machines. If the suggestion meets with favor arrangements will probably be made for such an exhibit at the next meeting.

A sidelight to the meeting was a statement made by President H. W. Alden during the factory management session that a leading steel manufacturer had told him that, from data secured in his plant from the study of the 8-hr. day, he was just about at a point where he could predict that the introduction of the 8-hr. day in the steel industry would result in a decrease instead of an advance in costs.

R. E. Flanders, president of the National Machine Tool Builders' Association and general manager of the Jones & Lamson Machine Co., in a paper on "Standard Machines for Quantity Production" discussed the problem of combining flexibility, high efficiency, low cost and low overhead in machine tools for quantity production. Mr. Flanders said in part:

A broad statement of the problem relating to standard versus special machines for quantity production is about as follows: How can machine tools be so designed and built that the user will have the advantage of a machine of proved excellence and low cost without losing the advantage of special adaptability and economy which the ideal special machine will give?

There are at least two methods of approach to a solution. One lies along the lines of building up semi-special types of machines out of standard units. The other consists in the design of a more or less universal foundation machine which is adapted to the making of various particular parts by adding a highly specialized tool equipment.

Why Special Machinery Sometimes Fails

The failure of hastily designed and built special machinery may come from a number of causes, such as faulty order of operations, unsuitable location and clamping of the work, etc. The most usual cause of failure, however, lies in the weakness, improper lubrication, or rapid wear of some essential parts of the mechanism, such as clutches, feed gears, sliding surfaces, main bearings, etc. It is difficult for the most skilled machine designer to be completely successful in these features in a new design. It is doubly difficult for the tool designer, however skilled, who attempts an occasional excursion into the field of machine design.

There are some operations where the completely special machine with its attendant difficulties is unnecessary, even when it is desired to have a machine completely adapted to a particular operation on a particular part. For milling operations on cylinder blocks, transmission cases, etc., and for multiple drilling operations on similar parts, special machines may be built up from standard units.

Building Special Machines from Standard Units

Milling machines, for instance, will vary considerably with the design of product. They will consist in general of a planer-type bed and housing, the latter carrying vertical and horizontal spindles as required by the part to be manufactured. In the case of V-type crankcases, spindles will require to be set at an angle.

Such machines as this should be, and usually are, built up from standard units. The spindle, its drive and housing need not vary greatly from machine to machine. The feed mechanism may be the same. Even the bed and work table may be built in standard lengths and widths. These standard units are of tested and approved design, and no fear need be felt of the failure of the machine. It may even be possible to rebuild it to fit a change in the design of the part manufactured, at a cost less than the purchase price of a new machine complete.

Perhaps I may be permitted to interject here a criticism of one common feature of these machines, though it is aside from the subject. They are often built with tables much too long, to take in a long string of work. If we double the length of the table we do not double the output. It takes twice the length of time to feed, twice the length of time to change work, twice the number of fixtures, and somewhat more for the cost of the machine and the floor space occupied.

Sometimes a little is saved by dividing among several pieces the time it takes to get the full depth or width of cut, but usually this is inconsiderable. The long table is probably a relic from planer practice where the planing of long strings of complicated work may be advisable in order to divide the tool setting time among several pieces. The practice has no place in high production milling, with cutters set in a fixed position.

The same principles as given for special milling machines apply also to multiple drills. The spindles themselves, their connection with the driving mechanism, the feed and driving gearing, etc., are proper subjects for standardization and this may be done and still provide a special machine adapted to the machining of a special part.

It is the office of the machine tool man to furnish a strong, reliable, versatile mechanism as a foundation. To do this requires years of development, including some "trial and error." It is not to be done in a day, or to order for quick delivery, if satisfaction is expected.

It is the normal function of the user to mount upon this standard mechanism special equipment which

(*Continued on page* 1219)

Progress Made in Gear Standardization

Two Standards Adopted by Gear Association—Progress in Other Standards Reported—Interest in Industrial Relations—Business Expansion Possibilities Discussed

As at previous meetings reports of standardization committees and discussions occupied the greater part of the time of the semi-annual meeting of the American Gear Manufacturers' Association, held at the Mountain House, Lake Mohonk, N. Y., Oct. 25, 26 and 27. Of the 16 committees on technical standardization, nine have already submitted reports and various degrees of advancement in the work of these committees is shown, from progress reports to definite recommendations. It was apparent that considerable work had been done and the spirit of cooperation was noteworthy. There was active discussion of reports and recommendations and many suggestions were given for further activity. A revised standard for composition gearing was adopted and the standard for transmission chains and sprockets developed by a joint committee of the S. A. E., A. S. M. E. and A. G. M. A. was accepted as recommended practice. Several addresses were made and time was set aside for visitation and recreation.

President George L. Markland, Jr., presided at the sessions, B. F. Waterman, Brown & Sharpe Mfg. Co., Providence, chairman of the general standardization committee, taking the chair when sub-committee reports were presented.

It was announced that the spring meeting will be held in Buffalo, April 28, 29 and 30.

New Members Elected

Six new member companies were elected to membership, the names and executive representatives of which being as follows: Western Gear Works, Seattle, Wash., R. C. Franke; United Engineering & Foundry Co., Pittsburgh, Lane Johnson; Universal Gear Works, Detroit, F. J. Brown; Automobile Machine Co., Cleveland, J. Kreisler; Barber-Colman Co., Rockford, Ill., F. G. Colman, and David Brown & Sons, Ltd., Huddersfield, England, F. E. Brown.

A report of the association's sectional committee of the American Engineering Standards Committee was read by Mr. Waterman, who is chairman of the sectional committee. Two meetings have been held, the nomenclature of gears being considered largely at both meetings and some 60 definitions being approved. Tentative standards for stub tooth gearing, as submitted by the French and Dutch engineering societies, will be taken up at the next meeting of the sectional committee. It was stated that the sectional committee has been enlarged to include other societies than the A. G. M. A. and the A. S. M. E., and that the work of this committee is receiving increasing attention from users of gears.

The report of the association's representatives on the A. S. M. E. research committee on gears, submitted by its chairman, E. W. Miller, Fellows Gear Shaper Co., Springfield, Vt., revealed that the work upon the design of the machine for testing gear tooth strength, described by Wilfred Lewis at the annual meeting in Cleveland in April, is about completed. It was stated that changes had been made in the mechanism since last year. Discussion of Mr. Lewis' paper by several English engineers was read in part, the comments being said to have proved helpful. Financial support from gear manufacturers for the completion of this work was sought and several members pledged varying amounts.

A revised standard, presented by the composition gearing committee, was adopted, with a possible change in the title to read "Flanges and Rivet Proportions of Composition Gearing." The subject covers gears made of rawhide and it is intended to give the designer something that will aid in selecting and laying out a pinion of proper proportions with the least amount of calculation. The report is made up of four pages, two of which are given to tables, one to line sketches and one to printed explanation. It is simpler and more condensed than anything heretofore. The results of physical tests on six materials used for non-metallic gears were given by F. G. Sorensen, Cincinnati Gear Co., Cincinnati, chairman of this committee. The tests included impact compression, deflection, transverse and tensile split, and the results for each material in each of these tests were given. Active discussion as to the method and value of these tests followed, centered for the most part around combination tests, running tests and bend tests. The committee was instructed to take the material presented in part at the meeting and work up a report, with photos and sketches for full presentation and discussion at the next spring meeting.

The standards for transmission chains and sprockets developed by a joint committee of the S. A. E., A. S. M. E. and A. G. M. A. were accepted as recommended practice. This report has been printed and copies were distributed. The sprocket committee with C. R. Weiss, Link-Belt Co., Philadelphia, as chairman, is working on uniform working loads, the horsepower transmitted at certain loads.

Standard Tooth Form Discussed

Action on a stub tooth standard was emphasized as especially desirable in the progress report of the tooth form committee, read by H. J. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J., chairman. The French permanent standardization committee has requested cooperation from interested societies. It was pointed out that there are at least nine stub tooth systems now in use. But two of these, the Fellows and Nuttall, are in extensive use, with the Hunt system a close third. Protests have been made against change by users of these systems on the ground of cutters on hand and gears now in use.

A previous report suggested harmonizing these objections by offering a composite system, using the Fellows proportions for the finer range of pitches and the Nuttall for the heavier pitches. It is now felt, however, that such an expedient will be but a temporary one. The three well-known systems practically agree on tooth depth proportions. The French propose a tooth still shorter, which it is believed, is too short for good running qualities. Several members of the committee favor a tooth of 1.6 diametral pitch working depth, against the French 1.5 D. P. It was stated to be doubtful if an entirely new system of stub teeth would be commercially acceptable, or would supersede those now in use. The proportions of a stub tooth, recommended for consideration as an American standard, is given in the report.

Progress has been made in the nomenclature and definitions relating to tooth forms, and material is expected to be presented at the next meeting. The committee is considering the various special gear tooth systems, such as Continental, Maag, special patented systems and tooth shapes, etc.

In the direction of standard tooth form it was brought out that the choice of a standard full depth tooth for interchangeable gears is resolving itself into adopting various standards for different purposes. For industrial spur gears running at moderate speeds the Brown & Sharpe involute shape is in general use, a tooth form said to be successful although understood to be of empirical and arbitrary derivation. It was said that later a basic rack for this system, perhaps a composite rack, could be defined. There are also 14½, 15 and 20 deg. standards in use and experience and tests to date were said to favor a long tooth and a pressure angle of 14½ deg.

The committee is not ready to recommend one standard as *the* standard. "To make progress," said Mr. Eberhardt, "we will have to define three different full depth systems, a 20-deg., a 14½-deg. using a standard hob, and another system, a composite cycloidal and involute of 14½ deg." In the discussion of this report, which was accepted as a progress report, it was brought out that the finer the gear is made the finer must be its mounting, this being a factor to be considered in the standardization recommendations. The elimination of "flats," which was of general interest, was also discussed briefly.

A section of the report dealing with long addendum drivers states that it is highly desirable to standardize the methods and values to be used in solving the various problems arising in this group of gearing. The most important departure from the usual standards is enlarging the pinion diameter. This enlarging is done to (1) make a stronger tooth, by eliminating undercut, (2) to obtain maximum bearing on the tooth curve, and (3) to increase the life of the gear by reducing the poor tooth action as the gear teeth approach each other and increasing the good tooth action obtained as the teeth recede from each other.

To Reduce Number of Worm Gear Hobs Carried

A report which evoked considerable discussion, and which was set forth as of vital interest to the engineering profession all over the world, was that of worm gear committee, which was read by J. C. O'Brien, Pittsburgh Gear & Machine Works, Pittsburgh, chairman. It is the same as submitted at the Cleveland meeting except for the addition of the suggestions brought out by the discussion there. It was the object of the committee in offering this recommended practice to try to reduce in number the worm gear hobs which are carried in stock by the various member companies. It was stated that there are hundreds and perhaps thousands of hobs in use when almost all cases would be covered if these thousands were reduced to hundreds. The committee's report not only makes recommendations for new designs, but also makes recommendations for use in connection with hobs already in existence which might not be just right for the recommendations as made by the committee.

A table of formulas offered in the report was said to represent an endeavor to compromise in a commercial, practical and scientific manner those elements of design and manufacture that affect the efficient performance of worm gearing that is used for ordinary industrial service. Worm gearing was divided into groups and the group covered by the report was defined as follows: Linear pitches, ¼-in. pitch to 2-in. pitch, multiplicity of threads, single to quadruple; gear ratios, 10 to 1 to 100 to 1. This group includes the worm gearing demanded by the trade for general commercial uses, where the gearing is furnished without bearings or housings. It does not include the gearing of units, shaft worms, smaller or larger pitches than mentioned, worms having more than four threads, gear ratios greater or less than that specified, gearing with the axis other than 90 deg. or where the duty required or quantity involved justify a further refinement of design than that used in the case of these general purpose worms and gears.

It was stated that in the case of worm gearing a longer period of transition from haphazard methods of designing to standard methods may be expected. In order that the best results might be obtained from existing facilities the report includes recommendations for the use of existing hobs.

In the discussion the question arose as to letting the following recommendation stand: "That triple and quadruple thread hobs should be fluted normal to the thread angle reckoned from the outside diameter of the hob." Difference of opinion was expressed as to advisability of specifying gash angle of hobs, some holding that this could be safely left to the tool makers, others holding that there must be one best gash angle and suggesting experiments to determine it. It was voted to let the recommendation stand for the time being as printed.

It was suggested by one of the members that some of the recommendations included in the report were coming out at a rather late date in view of developments expected which may cause radical changes. As no definite time was set as to when these new developments might be made public, it was thought that the recommendations in the report would be of great help to present practice.

The focus of the discussion was on the worm wheel dimensions rather than on those of the worm. A question was raised as to the advisability of limiting gear ratios to 10 to 1, a ratio of 5 to 1 being suggested by one member. One recommendation felt by many to be outstanding was the giving of a definite rule for the outside diameter of the worm. They standardize a given diameter for a given pitch. It was suggested that the next step was to standardize on shaft worms.

The semi-annual progress report of the spur gear committee of which F. E. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J., is chairman, states that on nomenclature the committee is finished up to date. It was also reported that its practical horsepower rules have been in use for several months, with some adverse criticism. More criticism is invited and further revision is expected before the next meeting. The subject of tolerances, now under way, will be submitted to the membership in the form of a questionnaire, suggestions on tolerances or limits as to accuracy, finish, etc., of both commercial and automotive gears being looked for.

Bevel Gear Nomenclature Submitted

The bevel and spiral bevel gear committee, together with the nomenclature committee, submitted a list of more than 60 definitions as accepted to date by the sectional committee. In addition, four charts showing the accepted nomenclature graphically—what each term is, where located and its relation to other terms—were submitted. Comment on the charts was active, centering for the most part on the discussion as to which angle should be called face angle, the angle between an element and the axis of the gear or the complement of that angle. The charts were referred back to the chairman of the committee, F. E. McMullen, Gleason Works, Rochester, for consideration of the points discussed. The definitions were not submitted as recommended practice, but for study and criticism by the members. It is expected that the necessary classifications as required by helical, worm gears and racks will be added as the work progresses.

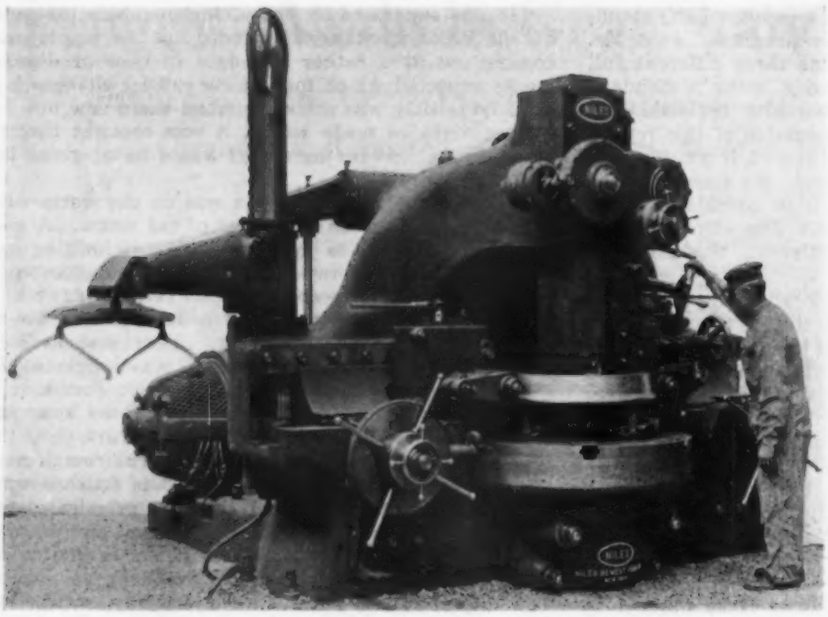
The herringbone gear committee, which is headed by A. F. Cooke, Fawcus Machine Co., Pittsburgh, is working on standardizing single purpose hobs for cutting herringbone gears, a report of which is planned for the next meeting.

A progress report of the differential committee was given by its chairman, S. O. White, Warner Gear Co., Muncie, Ind. The scope of the four-pinion differential design has been revamped and extended. Two sizes of four-pinion differential were submitted and for each size two alternative methods of mounting the side gears. One is that in which the side gear is carried entirely in the spider, this being the most generally used application. In the other the side gear is carried in the hub. Completely dimensioned detail drawings were submitted to the membership and the hope expressed that they would be studied and criticized. It is expected that the two-pinion type of differential in two sizes will be laid out in the near future.

A progress report was made by the gears and pinions electric railway mill and mine committee, which is headed by W. H. Phillips, R. D. Nuttall Co., Pittsburgh. In the discussion objection was raised to the tolerances of plus and minus on the bore of railway gears. Discussion centered on the question of unilateral and bilateral tolerances, the establishment of a unilateral tolerance being advocated. The committee is continuing its work on the advisability of the standard set on extra depth of keyway and the standardization of web holes.

Since June the inspection committee has endeavored

(*Continued on page* 1217)



Vertical Car-Wheel Lathe Designed to Shorten Time Usually Required to Finish Rolled or Forged Steel Wheels. Turning the contour of the tread and flange, facing the hub and run on one side, bossing eccentric hub, if necessary, and undercutting the rim, are done simultaneously. Scribing the wear line is done after the other operations are finished. The capacity of the machine ranges from 33 to 42 in. wheel diameters

Special Purpose Vertical Car-Wheel Lathe

Shortening of the time usually required to finish rolled or forged steel car-wheels is claimed for the vertical car-wheel lathe illustrated, a recent addition to the line of the Niles-Bement-Pond Co. The new machine has been designed as a special purpose unit to replace general machine tools heretofore employed for this work.

The machine receives the wheels as they come from the hot working operation. The machining consists of turning the contour of the tread and flange, facing the hub and rim on one side, bossing eccentric hubs if necessary, undercutting the rim, and scribing the wear line. These operations are done simultaneously, with the exception of the last which is done after the other operations are finished. The capacity of the machine ranges from 33 to 42 in. in wheel diameters. An output of 60 rolled steel wheels per day, approximately 525 lb. of metal removed an hour, is claimed. It is further claimed that the machine actually handles the same number of wheels on the operations mentioned above that formerly required 10 machines, the total number of machines required to accomplish complete machining on the same output being reduced nearly 60 per cent., with a corresponding reduction in labor costs.

The general construction of the machine may be noted from the illustration. It may be noted that there is a rough similarity to a boring and turning mill in the horizontal rotary table and long square steel bar adjustable vertically. The absence of any analogy to a cross-rail is, however, a departure.

The square tool bar is adjustable vertically in the main housing and carries a tool holder with inserted blades which face off the hub and boss eccentric hubs. A special motor provides this bar with power down feed and power traverse in both directions. The main right-hand side head is provided with power feed and is used to rough turn the flange and tread. It carries an auxiliary tool head in which are fitted the tools which face and round the rim, undercut it and another tool that later scribes the wearline. The tools have cross and vertical hand adjustment. The left-hand side head makes the finishing cut on both flange and tread. This head is provided with vertical hand adjustment and power cross feed. The feeds to all heads are independent of each other and all have automatic trips which disengage feeds at any predetermined point.

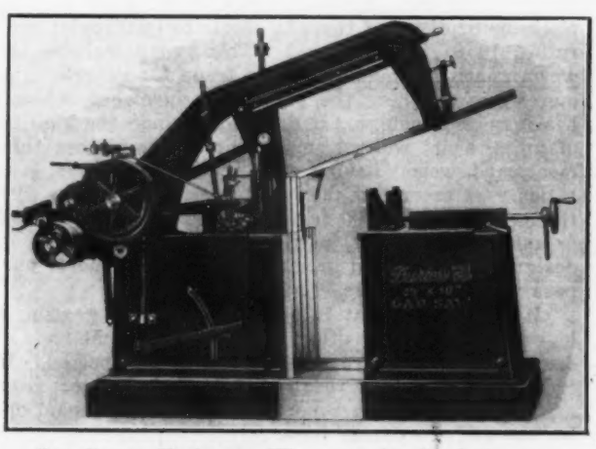
The main driving gear is a Maag cut spur gear with a 12 in. face and twice the diameter of the table. A variable speed motor with a three to one range is direct-connected to the machine. Adequate lubrication has been provided. The table track and spindle run in an oil bath. The lubricant flows by gravity from a reservoir inside the machine to the track and spindle, from which it drains into a filter tank in the reservoir. A small motor drives a pump which returns it to the reservoir. The main drive gears are inclosed and run at high speed in oil, and shaft bearings are provided with sight feed oilers.

Handling and set-up time is minimized by the combination of a pneumatic crane, patented pneumatically-operated center jaws which expand inside the center hole of the wheels, and three serrated driver dogs which support and drive the wheel on the table. A roller on the left-hand side head brought into contact with the wheel before chucking serves to center the wheel in place.

New Type of Power Hack Saw

The power hack saw illustrated, known as a gap saw, has been placed on the market by the Peerless Machine Co., Racine, Wis. When the gap is closed the saw may be used for ordinary purposes; when open, increased work holding capacity of 24 in. in height and 16 in. in width is available.

The work may be clamped either to the finished vertical face on the bed or directly to the base. A piece of steel 16 x 26 in. in size may be cut in two by sawing



Gap Power Hacksaw. When gap is closed the machine is used for ordinary purposes; when open an increased work holding capacity of 24 in. in height and 16 in. in width is available

13 in. and then meeting the cut by turning the piece half way around, work of this nature being frequently required in railroad and drop forge shops, and in structural steel yards. Hammered forgings such as used for crankshafts may be blocked out by the saw before the machining operations.

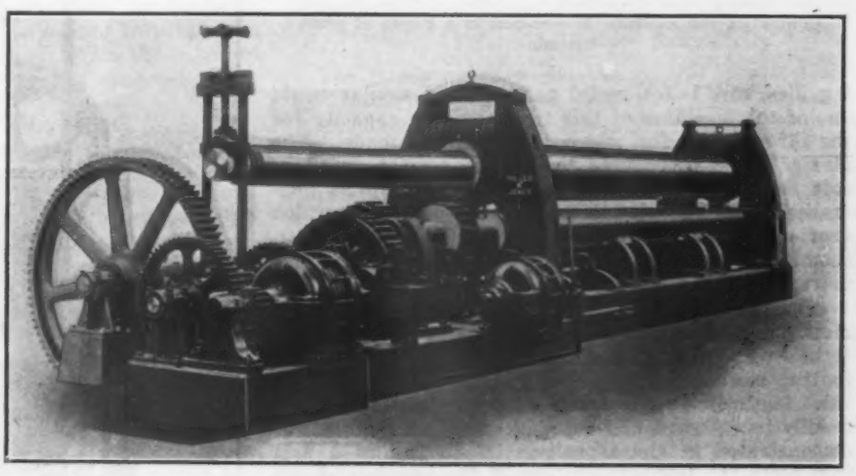
The head and feed mechanism is the same as that used in the company's standard 13 x 16 in. high speed saw. The head lifts up on each return stroke, and when the blade comes to the bottom of the cut, the feed disengages automatically and the head is lifted to the uppermost position by means of springs. Blade pressure or feed may be varied also by raising or lowering the ratchet lever shown at the side of the head. The machine illustrated is equipped with a six-speed stroke mechanism for varying the speed to suit different materials. The machine is driven by belt or motor, and the six-speed gear box may be omitted if desired.

A water trough extending entirely around the base serves to convey the coolant back to the reservoir in the rear of the base. From the reservoir a rotary geared pump delivers the coolant to the distributing pipe. The finished pad opposite the gap on each side of the base is intended for the convenience of the operator when locating work clamped directly to the base. The left-hand edge of the bed is also finished for convenience in measuring.

The capacity of the machine for gap work is 16 x 37 in. The length of blade is 14 to 24 in. and the strokes per minute of the saw frame are 125. The length of the machine is 80 in., the width 30 in., and the weight approximately 3000 lb.

New Large Boiler Plate Bending Roll

An unusually large boiler-plate bending roll, recently installed in the St. Louis shop of the Heine Boiler Co., is shown in the accompanying illustration. This equipment is a new heavy-duty hinged-housing machine designed for plates up to 1 5-8 in. thick, rolling these to relatively small diameters, and was built by the Hilles & Jones works of the Consolidated Machine Tool Corporation of America, Rochester, N. Y.



Boiler Plate Bending Roll With Hinged Housing, Designed for Plates Up to 1⅝ In. Thick, Rolling These to Relatively Small Diameters. The distance between the housings is 26½ ft., amply accommodating plates 26 ft. long. Two interchangeable upper rolls are provided. Two speeds are available, one for the heavier and one for the lighter plates

The distance between the housings is 26 ft. 6 in., providing ample length for rolling plates 26 ft. long. The machine is provided with two interchangeable upper rolls, the larger of which is 36 in. in diameter and the smaller, 30 in. The 36 in. roll is used when rolling the heaviest plate and to ordinary diameters, and the 30 in. upper roll is used when rolling plates to small circles of about 36 in. diameter. The lower rolls are 22 in. in diameter. The roll journal-bearings in the housings are bushed with bronze.

The roll forgings proper are of open-hearth forged steel, and the upper rolls have a solid forged extension which provides for counterbalancing when the back housing is dropped down for the removal of plates rolled to full circles. The rated capacity for the machine is a pressure of 2,500,000 lb. which is regarded as a conservative rating as the factor of safety is high. The housings and driving gears are steel castings and the housing bed plates and gearing bed plates are semi-steel castings of box section design.

The upper roll is supported from the roll necks which are fitted in trunnions having bearings bushed with bronze. The trunnions are carried in yokes, the back yoke being a steel casting, the front yoke, which supports the upper roll when counterbalanced, being a steel forging machined to shape. The raising and lowering of the roll is through a worm and worm wheel drive, designed so that both ends of the upper roll may be raised or lowered simultaneously or one end held stationary while the other end is raised or lowered. This arrangement for operating the upper roll is necessary in rolling plates to conical shapes, and is often found advantageous in ordinary boiler shop practice. The worms are of machined cast bronze and run in inclosed bearings designed to provide for lubrication with either heavy oil or grease. The worm wheels meshing with the worms are made of cast steel and have teeth cut from the solid. The driving pinions on the lower roll necks are steel castings shrouded to the pitch line. These pinions are driven from a wide faced cast steel gear also shrouded to pitch line, and this driving arrangement conveys power directly to both lower rolls.

Two speeds are available, a slow speed for handling the heavier plates, and a high speed for handling lighter plates. The control of the speeds is by hand levers direct to positive clutches. Two roller supports are provided for the lower rolls and each support carries four forged steel rollers finished to 7 15-16 in. diameter. The rollers are carried in closed end bearings, and lubrication is by means of large grease cups. This arrangement is intended to assure adequate lubrication and keep scale and dirt from clogging and stopping the action of the rollers.

High-speed shafts have bearings bushed with bronze, and outboard bearings are provided to carry the outer end of all driving shafts so that there are no overhanging gears.

The machine is operated by two motors, one of 125 hp. being used for driving the lower rolls and one of 60 hp. for raising and lowering the upper roll. The weight of the machine, which is designed as the No. 9 bending roll, is 415,000 lb.

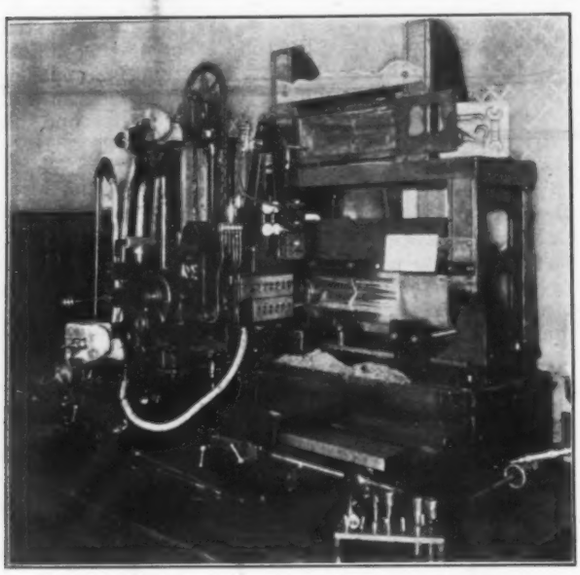
The Baldwin Canadian Steel Corporation, Ashbridges Bay, Toronto, Ont., proposes to resume operations at its tin plate mill early next year. An executive of the company states that two of the English directors will arrive in Canada early in November to consider the whole situation and it is possible that certain reorganizations will be carried out, and the plant reopened early in the new year. The present plan calls for the early rehabilitation of the plant and a large number of men will likely be put on for repair work and completion of the eight furnaces and mills.

Steamships launched in the third quarter of 1923 are reported by Lloyd's register as 98 in number, with a gross tonnage of 248,354. Germany led with 59,073 tons, followed closely by Great Britain and Ireland with 58,498. The United States in third position had 33,622 tons, while Holland and France followed with 23,137 and 19,800 tons respectively.

Adds to Line of Die Sinking Machines

A recent addition to the line of machines of the Keller Mechanical Engineering Corporation, Brooklyn, N. Y., is the B G-482 automatic die sinker illustrated, which was exhibited at the Steel Treaters' exposition held recently in Pittsburgh. The machine was shown in operation cutting a die for a Westinghouse turbine blade.

Machines of this type are built in several sizes, being available for use in sinking forging dies, stamping dies, core boxes, metal patterns and similar work, one of the machines of this type having a capacity for the largest dies for which hammers are made. The master to be reproduced may be of cement, wood or soft metal. For contouring, a zinc template is generally used. The electric control of the tracer, which exerts only very light pressure against the master, combines the utmost cutting power with close accuracy in reproducing a pattern.



Die Sinking Machine Cutting Die for Turbine Blades. Control of the machine is centered in a group of push buttons

The control of the machine, either hand or automatic, is centered in a single group of push buttons. It has rectilinear motion in three directions and contouring motion in any direction in the one plane. With this feature, any outline, however intricate, may readily be followed and reproduced. This feature was demonstrated at the exposition by cutting in a cast iron plate the intricate contour of the template shown in the illustration, mounted on the machine above the turbine blade master. All the movements are in the head, and are on heavy slides and effected by lead screws. The electric controls are contained in a steel cabinet, and are easily accessible.

Sizer Steel Corporation Resumes

Announcement has been made by J. T. Dillon, C. B. Porter, and S. F. Hancock, receivers of the Sizer Steel Corporation, Buffalo, that the manufacture of commercial forgings has been resumed, following the suspension of business in connection with the receivership. The company turns out open-hearth and electric steel forgings in both carbon and alloy grades, and also wrought iron, in addition to regular lines of electric steel die blocks and oil well billets.

Cast Iron Pipe in September

Figures of the Department of Commerce show the production during September of 77,186 tons of cast iron pipe, and the shipment of 78,101 tons. Both figures are lower than August and lower than the average of a series of preceding months.

Develops Safety Vacuum Torch

The Mahr Mfg. Co., Minneapolis, has placed upon the market a safety vacuum torch, the operation of which is based upon the same principle as that of the heating element in its portable rivet forges. A feature is that no pressure is used upon the oil tank or hose lines.

The tank has a capacity for 20 gal., and is of heavy gage welded construction. It is carried on a steel axle and roller bearing mounted wheels, and side brackets are provided to carry 12 ft. of hose, extra nozzles and the torch itself. Simplicity of design is claimed as a feature of the torch, patented valve in head construction giving positive shut-off and eliminating dripping at the nozzle. The oil is always at the head and the torch may be started instantly.

There are separate controls for the oil and air, which is intended to provide a range of adjustment and capacity. The air control valve is of the plug cock type, ground to fit, and elimination of restrictions in the air passage of the tank is said to minimize pressure loss. The oil valve is of the piston valve type, and may be finely adjusted. Both valve controls are placed well back from the torch nozzle, for the convenience and comfort of the operator. Oil and air tubes are brazed into the body and head.

A special atomizing nut provided is said to effect complete atomization without restriction of air flow, and to make the flame steady and continuous. In the double chamber nozzle, the vapor is discharged from the atomizer into the first chamber, where it ignites.

New Torch the Feature of Which Is That No Pressure Is Used Upon the Oil Tank or Hose Line

The burning vapor in passing through the choke into the second chamber draws in free air through the auxiliary air openings, making, it is claimed, a good burning mixture within the nozzle, producing a steady flame.

Power Exposition

Plans for the National Exposition of Power and Mechanical Engineering at Grand Central Palace, New York, call for cooperation of national engineering societies. The exposition will be open Dec. 3 to Dec. 8, at the same time as the annual meeting of the American Society of Mechanical Engineers. To avoid conflict between the two events, the technical sessions are set for mornings, while the exposition will open at 1 p. m. each day. At the same time, the American Society of Refrigerating Engineers will hold its annual meeting at the Hotel Astor.

German Iron Industry Paralyzed

New Steel Prices—Political Situation and Lack of Orders, Capital and Stable Currency—Industrialists Make Ten Requests of Government

(*By Radiogram*)

BERLIN, GERMANY, Oct. 29.—Quoted in gold marks, ingots are now $151.40 per metric ton ($36.60 per gross ton). Steel bars are quoted at 219 marks per metric ton (2.36c. per lb.). Thin sheets are quoted at 344.80 marks (3.72c. per lb.).

(*By Letter*)

BERLIN, GERMANY, Oct. 15.—As result of an "Empowering Bill" passed by the Reichstag Oct. 13, all German business, and with it the steel, iron and coal industries, have been removed from parliamentary control, and placed under a dictatorship. The bill authorizes the Cabinet to adopt any necessary measures, financial, economic or social, without obtaining legislative authority, and in doing this the Cabinet can override the constitution or any existing law. The only exceptions are industrial working hours and social pensions, which will still be regulated by law, not by decree.

A more complete dictatorship has never existed in any modern state. The Government was forced to demand, and the Reichstag to grant, these powers by the urgency of the financial and business crisis, and by the slowness of Reichstag procedure. The first cabinet measure under the law has been to put all taxes on a "stable value" basis, which means that the taxpayer must increase his paper mark payments in proportion to the decline in the mark's value. With the proposed *new mark* in circulation, finances are expected to improve.

Control of the 8-Hr. Day

The 8-hr. day question is on the verge of solution. The Socialists until lately held rigidly to this limitation of working hours, and refused to allow Chancellor Stresemann to regulate it by decree. Nevertheless, three-fourths of the Reichstag Socialist members lately voted for a resolution permitting modification of the -hr. day, while holding to it in principle. The Cabinet has now submitted a bill permitting increase of working hours to beyond eight, either by agreement between employers and employees, or by official order (in State-owned concerns). Formerly the 8-hr. day could not be lengthened even when the men demanded it. The bill, which will probably pass the Reichstag, enacts that in general industries working hours may not exceed 10 hr. daily, and that in sub-surface mining and in industries prejudicial to health they may not exceed eight. The last provision is a great gain in time, as at present underground coal miners work only 7 hr. Workers employed on the surface in mines will henceforth work 10 instead of 8 hr. This reform is of enormous importance and is an outcome of the admission of prominent Socialists, such as Schiffer and Calwer, that the present impoverished Germany cannot afford a luxury which prosperous pre-war Germany did not enjoy. The prolongation of working hours in mines is associated with a move to reduce industrial production costs, a serious item in which is fuel.

The critical internal and external political situation is paralyzing industrial and trading activity. Employment at the iron and steel works in Germany has been bad for some time in spite of the exclusion from competition of the Rhenish works. Many inland customers have cancelled orders because of poor business and lack of ready capital and consequently manufacturers are endeavoring to increase exports. During the Ruhr occupation and the prohibition of exports from these districts, German firms lost many foreign customers to Belgium and Lorraine and competition from these countries has been considerably strengthened by the absence of German material. German exporters are therefore giving special attention to the Near East markets which seem to be favorable. The engineering industry is also struggling against adverse conditions.

Receding Operations

Costs of production and raw materials, especially cast iron, have greatly increased. The goldmark prices of cast iron have been doubled during the last two months and it is generally recognized that they are too high. At the beginning of October they were about 60 per cent higher than prewar and a reduction of goldmark prices seems imperative if business is to improve. The heavy advances in railroad rates and in taxes are also partly responsible for the high level of prices. Scarcity of capital and difficulty in obtaining credit at a reasonable rate forced many firms to abstain from carrying any more than stocks for immediate needs. Few new orders are being booked and scarcity of raw material is in many instances hampering execution of those on hand. Production has, therefore, been reduced in practically all lines, unemployment is further increasing, and even large companies are only able to maintain their working forces by operating on part time. Many are operating 32 or only 24 hr. per week and the number of firms working full schedule is decreasing every week. The number of unemployed in the metal and engineering industry amounts to about 8 per cent, those on short time to about 32 per cent.

Efforts to Reduce Prices

The strong agitation for the general introduction of gold mark prices has been successful. With the general introduction of the gold mark, prices are governed by the advance in the dollar. The paper mark is however still legal currency and the losses sustained through depreciation from day to day are enormous. Therefore goods are held back in many cases and the amount of business done is reduced. The efficiency of production per head has decreased considerably and Rhenish-Westphalian mine owners had decided to increase working hours to the pre-war standard in order to raise the output. At the same time they were willing to reduce the price of coal by 6 gold marks per ton. In consideration of the internal political developments they were obliged to abandon the enforcement of their demand for the present, but negotiations have now been started with the trade unions for an agreement in this respect.

There seems to be no other possibility of improving conditions in trade, industry and exchange than reducing the prices of industrial raw products so that the gold prices which are at present in many industries above international level are coming down. This point of view has prompted the Government to abolish the coal tax, which has led to an immediate reduction in the price of coal. In order to support the new course, the mine owners have not only lowered prices by the amount of the tax but by another 10 to 15 per cent, which cheapens coal altogether by about 30 to 35 per cent.

The increase in working hours in the Ruhr is at present, only problematical, as the stagnation in railway transport forces many firms to work short time. The northwest group of the German Iron and Steel Association has gone on part time and the great works of Thyssen, Dortmunder Union, Hösch, Bochumer Verein and others are working only 30 hr. per week. Krupp is operating on a 6 hr. day. The Westdeutsche Eisenwerke (ironworks belonging to the Buderus company) has closed because of scarcity of orders. The Rheinische Metallwaren- und Maschinenfabrik (metal goods and engineering firm) has dismissed 50 per cent of its employees as the financial support of the Government is discontinued.

On the liquidation of the Ruhr struggle, Stinnes and other representatives of the mining and iron industry

in the occupied area have submitted a petition to the Government containing 10 requests, which include compensation for the coal requisitioned during the occupation and for the coal tax imposed during that time, abolition of the coal tax in the Ruhr district, preferential treatment of the occupied area in the supply of raw material and foodstuffs, abolition of State control of coal in the Ruhr, authorization of the representatives of the Ruhr industrials to negotiate with the occupation authorities, extension of working hours to 10 generally, and to 8½ in the mines, and discontinuation of the demobilization measures. The question of the formation of a special company for the railroads in the Ruhr under the joint supervision of the Rhineland, France and the industry is also brought in. The Otto Wolff concern has not awaited the results of the petition but has already concluded an agreement with the French, and the Phoenix and Rheinstahl works are again busy on reparation account. This concern has also received permission to export coal and iron products.

There is no sign of a general resumption of work in the Ruhr. Apart from technical difficulties, the employers have no money. Since Oct. 15, the Government has refused to guarantee wages by way of credit, and it announces that unemployed workmen on the Ruhr will receive only the ordinary local unemployment allowances. The complete restoration of work in the coke plants will take, experts declare, at least three months; but the blast furnaces are in good order, and smelting could be resumed at once if ore and coke were obtainable, and if the necessary money for wages could be raised. In Dusseldorf are about 100,000 unemployed, and large numbers are reported elsewhere. Official statistics, being usually more than a month old, do not show this unemployment; but show, nevertheless, a slow aggravation of conditions.

An improvement is not likely. Although the demand for pig-iron, steel, heavy material generally and rolled materials is still active, as a result of the stoppage of Ruhr deliveries, the iron-using manufacturers all complain of a dead home market and of increased difficulties in exporting, owing to the fact that world-market prices have been passed. The rapid rise in home gold prices is shown by the fact that this month for the first time, the commodities index for home-produced goods exceeds that for imported goods. Whereas on June 1, domestic prices as compared with 1914 had risen 10,441 fold and prices of imports 17,345, or more than 60 per cent more, on Oct. 4, domestic prices had risen 156,440,452 fold while prices of imports had risen only 143,368,070 fold.

In particular the Solingen steel, Velbert lock and Schmalkalden small-iron districts complain that their products are dearer than foreign. As this is true also of rolled materials, the Government has been obliged to free such goods from export and from the obligation to procure export licences.

The Iron and Steel Foreign Trade Control Board, the chief function of which was the granting of export licenses and testing export prices, is being dissolved permanently. Meantime, in order to encourage export the board has authorized sales of semi-finished iron and steel abroad at below the ordinary domestic price, on condition that the exporter delivers the same quantity to the home market at the same special low price. Exporters do not believe that the present high gold prices of German steel will be maintained after the currency crisis is overcome; and hold that Germany as before the War and until lately will be easily able to compete.

An understanding has been arrived at between the Swiss machine tool firm Oerlikon and the Magdeburger Werkzeugmaschinen Fabrik (machine tool firm) which is connected with the Stinnes concern. The Magdeburg firm is said to have acquired the majority of Oerlikon. The Motor Aktien Gesellschaft which belongs to the Brown Bovery concern, and the Kolumbus Gesellschaft are merging. The Kolumbus company is interested in South American electrical undertakings.

The Köln-Lindenthaler Metalworks are increasing the nominal capital. The additional capital is to be used for the linking up of other works and negotiations for a fusion with the Iron and Steelworks Krone are nearing conclusion.

The German official trade statistics for August show that export of rolled material increased from 69,793 tons to 91,547 tons, against 193,000 tons, last year's average, while that of machinery decreased from 27 612 in July, to 24,689 during August. Imports of pig iron and scrap were slightly higher than last month, but the exports decreased considerably.

BELGIUM HOLDS PRICES

Few Concessions Noted—Settlement of Ruhr Expected to Force Reduction by Increasing Franc Value

ANTWERP, BELGIUM, Oct. 10.—Notwithstanding the numerous fluctuations of the pound sterling, prices for iron and steel have continued nearly the same as last week, which was somewhat easier and lower than a fortnight ago. Prices per metric ton for domestic consumption, f.o.b. makers' works are as follows:

	Fr.		
Merchant iron No. 2	675 to	700	$35.20 to $36.40
No. 3	700 to	725	36.40 to 37.80
No. 4		750	39.00
Heavy sheets		775	40.50
Thin sheets		1,150	61.00
Bars	725 to	750	37.80 to 39.00
Rails		750	39.00
Heavy beams		700	36.40
Rods		925	48.00
Open-hearth steel: ordinary		740	38.60
Rounds		1,400	73.00
Spring steel		1,400	73.00
Basic Bessemer ingots		525	27.40
Blooms		550	38.60
Billets		575	30.00

Business is scarce and the market is apparently becoming weaker. Makers are being slowly forced to come back into the market for tonnage, while buyers still maintain their position, asking for a reduction of prices sufficient to enable them to compete abroad, notwithstanding the lower rates of foreign currencies. Considering the still unsettled situation in the Ruhr and as the idea persists that foreign exchange will soon recover, makers, not in a hurry for orders, are not inclined to make large concessions. They agree to better delivery but try to maintain prices. Buyers and especially exporters seem to expect a favorable arrangement with Germany and as a result a further increase in the value of the franc, which would cause a serious decline of the prices. The result is that little or no business is being transacted and that the real tendency of the market is not defined.

Merchant iron has been quoted at 725 fr. f.o.b. Antwerp for No. 3 quality or $37.80 but without takers. Belgian plates have been offered abroad and at prices such as $37.60 per ton, but even such quotations seemed too high. Still lower prices were being quoted in foreign market. This price however represents about 720 fr. f.o.b. Antwerp which is considerably less than the domestic price.

Quotations for steel are no more favorable. Makers would gladly book orders at the nominal price of 725 fr., but this is equal to 165 s. or $37.75, prices which are again too high. French works have been offering large tonnages of steel products at very low prices which is certainly not improving the situation. Corrugated reinforcing bars are offered at base prices of $48 to $52 f.o.b. Antwerp. Luxemburg makers have been quoting in pound sterling and dollars nearly the same prices for ingots, blooms and billets as Belgian makers. Only one works has underquoted its competitors to book enough tonnage for several months.

In general the coke situation is highly unsatisfactory in Luxemburg, so that these works are nearly out of the market on pig iron. On the contrary, Lorraine works have come back into the Belgian market with large tonnages of foundry iron at the same prices as Belgian sellers are quoting. The price for foundry No. 3 is about 460 fr. per ton or $24, f.o.b. Antwerp or

delivered at consumers' siding. The expectation was that prices would be largely increased by this time, but lack of big demand and dullness in export has made it exceedingly difficult to maintain the present level. Prices for basic Bessemer pig iron are also much easier. An average quotation is 410 to 420 fr. or $21.40 (94 s.) which is still somewhat too high for export to England.

At present 41 blast furnaces are operating. Among these four furnaces are producing high phosphorus foundry iron, one furnace Bessemer hematite and the remainder are on steel making iron. The anticipated production for this month is estimated at about 9000 tons of high phosphorus foundry iron, about 4500 tons of low phosphorus Bessemer and 200,000 of steel making iron.

Some good sized tonnages of British hematite have been sold in Belgium. The lower rate of exchange was of course a factor in this business. Prices quoted on mixed numbers East Coast hematite ran between 105 s. and 106 s., c.i.f. Antwerp or $24.20.

Prices for coal have been somewhat higher. Importation of British industrial coal continues. Prices have been reduced in proportion to the change in rate of the pound sterling. The situation in the Belgian coke market is still satisfactory.

In general the coal and coke markets are firm with higher prices. On the contrary, the iron and steel market is vacilating. Large export business seems possible only in proportion to the favorable fluctuation of exchange or should makers agree to a reduction of prices.

Steel Men Testify in Assigned Car Case

Importance of Private Ownership of Rolling Stock Is Emphasized in Hearing Before I. C. C.—Mr. Schwab and Others on the Stand

WASHINGTON, Oct. 30.—The great importance iron and steel manufacturers and makers of by-product coke attach to the ownership of private cars for their use in transporting coal to furnaces, ovens and mills without restriction has been strongly emphasized at the rehearing before the Interstate Commerce Commission in the so-called assigned car case. Such prominent men as Chairman Charles M. Schwab of the Bethlehem Steel Corporation; President James A. Campbell of the Youngstown Sheet & Tube Co.; Vice-President C. A. Buck of the Bethlehem Steel Corporation, in charge of raw materials; Comptroller F. A. Schick of the Bethlehem Corporation; Harry Colby, member of the firm of Pickands, Mather & Co., and President H. B. Rust of the Seaboard By-Product Coke Co., submitted evidence in an effort to have the commission modify its decision, the effective date of which as now proposed is Dec. 1. The railroads and industries owning private cars contend that the order of the commission, applicable only in times of car shortage, will deprive them of the use of their mines, when they are most necessary, because it would compel them to release their cars for commercial loading. There is a strong prospect that the case may be taken up to the Supreme Court unless the order is modified. The hearings, begun on Oct. 22, probably will continue throughout the present week. Steel executives took the stand under the direction of C. S. Belsterling.

Good Coal Necessary

Mr. Schwab, Mr. Campbell and Mr. Colby testified last Saturday. Mr. Schwab made it clear that the proper kind of coal for making coke is absolutely necessary and that therefore it is essential that the Bethlehem organization be permitted to use its own cars with freedom for conveying the coal from its mines in the quantity and of the quality most suitable for making coke. The Bethlehem company owns 4000 cars, Mr. Schwab pointed out, which were acquired in 1920 as the only way to meet difficulties faced in 1919 and 1920 as a result of the car shortage and the consequent disarrangement of proper coal deliveries. The company, he said, did not wish to enter the business of owning its cars, but was forced to do so in order to get pure fuels for pure materials, and it was because of this that he approved the expenditure of the millions of dollars needed to put the company in a position to send its cars to the mines for coal when it was required.

Mr. Schwab detailed plans of financing the purchase of the cars, and the modern methods of making steel, calling for the right kind of fuel. The cars did not pay, he said, except in service rendered by preventing a breakdown of operations or the serious crippling of them. It was his opinion that the allowance made by the railroad companies for the use of cars was sufficient to provide for their upkeep.

The evidence of Mr. Schwab was approved by Mr. Campbell in practically every way as it applied to the ownership by the Youngstown Sheet & Tube Co. of 1300 standard steel hopper bottom coal cars, 10,500 acres of coal land in Pennsylvania and 4500 acres of coal land in West Virginia. Mr. Campbell's testimony differed slightly from that of Mr. Schwab, however, in that Mr. Campbell declared that the mileage allowance did not cover the upkeep of the cars of the Youngstown Sheet & Tube Co., which he said amounted to 2.5c. to 3c. per ton of coal. Mr. Colby said that the ownership of cars was necessary to assure continuous operations of furnaces. Without the cars, he testified, delays that could not be endured without financial disaster would result as well as difficulties in grading coal. Mr. Schick gave the commission figures concerning the investment by the Bethlehem Steel Corporation in different kinds of property, including coal cars, while Mr. Buck emphasized the necessity of the proper kinds of coal and of cars to haul the fuel when it is needed.

Not Given Preferred Movement

John M. Goss, traffic manager of the Bethlehem Steel Co., presented voluminous figures, the principal purport of which was to show that private cars are not given preferred movement by system cars, as had been charged. Statistics were submitted by him designed to show that system cars actually move more quickly in times of car shortages than private cars do. One set of figures showed that the speed of system cars for a certain period averaged 60.2 miles per day over a distance of 203.9 miles while the average daily speed of private cars was 60.8 miles per day over a haul of 249.3 miles. He said that it is obvious that the speed in similar traffic is the same in the case of private cars used in longer hauls. In reply to a question, he said that system cars should speed up railroad-owned cars because there are always a great many "foreign" cars on the lines hauling them at the rate of $1 per day for each car. It was also stated by Mr. Gross that private cars make less use of the motive power, tracks, yards, etc., of railroads than system cars do and that private cars do not use the railroad terminals.

As coal and coke agent for the Youngstown Sheet & Tube Co., W. B. Prescott pointed out that prior to ownership by the Youngstown company of its cars it was unable to obtain coal regularly in the quantity and quality required at its plants. He declared that this was particularly true of by-product high volatile coal. Since the company has acquired its own cars, it has, with few exceptions, Mr. Prescott said, been able to obtain sufficient tonnages regularly and of the

quality desired. Mr. Prescott expressed the opinion that if the rule is changed as proposed, the company will be unable to accomplish this and will be in the same position it was in before obtaining its own cars.

Large Investment of Steel Corporation

Appearing on behalf of subsidiaries of the United States Steel Corporation which own private cars, Louis C. Bihler, traffic manager of the Carnegie Steel Co., Pittsburgh, and vice-chairman of the committee of traffic men for other subsidiaries of the corporation, declared that the subsidiaries own 5200 coal cars in which is carried 5,000,000 tons of coal and coke annually, equaling 25 per cent of coal used by the corporation each year. Most of the coal hauled in the private cars, it was stated by Mr. Bihler, is of the coking grade for the by-product ovens. A number of the subsidiaries, he said, also own private tank cars for carrying petroleum and its products. The private car investment of Steel Corporation subsidiaries was said to be approximately $16,000,000. Purchase of the cars was begun in 1917 as the result of shortage of railroad rolling stock. He declared, upon cross-examination, that the Steel Corporation did not ask for preference, does not get it and does not want it, but the cars were necessary in order to haul coal, and maintain operations for producing steel and meeting contract obligations. Like other steel men, he said the cars were not wanted except as a necessity for hauling fuel. Denial was made by Mr. Bihler of a report that the Steel Corporation is negotiating with the Norfolk & Western Railroad for the right to use private cars.

Mr. Rust, who was the first witness appearing at the rehearing for private owners of cars, told the commission that if the Seaboard By-Product Coke Co. were deprived of its 1000 cars, it would suffer great damage. Granting that assurance could be given by the railroads of an adequate supply of suitable coal from the mines, Mr. Rust explained that the company would willingly give up its own cars, which were said to have caused the company a loss of $800,000. The cars were referred to as insurance and Mr. Rust said they were bought as a necessity and offhand were not a good investment.

"An Economic Crime"

Burning of raw bituminous coal was described by Mr. Rust as an economic crime, resulting in the loss of billions of dollars worth of natural resources. He declared he did not go so far as to advocate prohibition of coking of coal by the beehive process because this process was said to have its place in times of peak demand. Steel plants, he stated, could not continue competition without by-product coke ovens. The United States was said to be ahead of Europe in this matter, although Germany, according to Mr. Rust, has not produced a pound of beehive coke for 20 years and the ability of that country to hit hard at the beginning of the war was attributed to her preponderance in by-products from coking coal. By-product coke ovens were called the basis for materials of war, for fertilizer, the dye and chemical industry, and for the cheapening of gas and coke for domestic use. Establishment of 1500 by-product ovens was encouraged by the Government during the war, Mr. Rust said, and he estimated the loss caused by the production of 24,000,000 tons of beehive coke at $96,000,000. The sale price of products from by-product operation that were wasted by the beehive process was placed at $4.09 per ton. The materials wasted were said to consist of 25 gallons of sulphate of ammonia, 6000 cubic feet of gas, 10 gallons of tar, the base for dyes and chemicals, and three gallons of motor fuel which, it was said, sometimes could be more profitably sold by including it in other products as heat units.

Great Care Required

The great care required in preparing coal for by-products ovens was explained by Mr. Rust, who asserted that one plant at Bethlehem, Pa., had to be rebuilt in two years at a cost of $2,000,000 because it had used unsuitable coal, while a plant at St. Louis had been used for six or eight years with practically no cost for new ovens, but damage of $250,000 was sustained later because a heater was given coal with which he was not familiar. Mr. Rust said that correspondence with members of the commission itself had given him the impression that the commission thought it would be a good thing for the company to buy its own cars.

President Robert Hobson of the Steel Co. of Canada, with a plant at Hamilton, Ont., told the commission that his company, together with Pickands, Mather & Co., purchased 400 cars in 1920 because of their experience in the preceding year with car shortage in getting coal from the Mather mine in Greene County, Pennsylvania. The carriers are ferried across Lake Erie from Ashtabula, Ohio, when possible. Mr. Hobson said that the purchase of private cars seemed necessary, the only alternative being to establish spare mines as sources of supply when congestion exists at some point. He admitted, however, in reply to a question by Commissioner Potter, that if everybody should do this, the miners probably would work only a day or so and more trouble would come from that source than now exists.

Plant of American Puddled Iron Co. Nearly Completed

The new plant at Warren, Ohio, of the American Puddled Iron Co., Youngstown, is virtually completed and ready for operation. Delayed delivery of minor equipment has prevented its immediate operation. The plant has an initial capacity for producing up to 250 tons of mechanically puddled iron and rolling up to 1000 tons daily. Of four mechanical puddling units, but one has been installed at this time, in order that its operation may be checked and changes made as experience dictates. When operations do start, they will be at a reduced rate, in order that the machinery may be given the proper tests. It is unlikely therefore that the plant will get under full headway for some time. It represents an initial expenditure of approximately $2,000,000 and will manufacture at the start iron for pipe makers. Its customers will be such large manufacturing consumers as the Youngstown Sheet & Tube Co., Republic Iron & Steel Co. and the A. M. Byers Co.

Negotiations of Inland Steel Co. for Purchase of Other Properties

CHICAGO, Oct. 30.—Negotiations between the Inland Steel Co. and the Milwaukee Rolling Mill Co. with a view to the purchase of the latter's sheet plant at Milwaukee have come to a halt following a failure of the two companies to reach an agreement as to terms. The acquisition of the Acme Steel Goods Co., Chicago, by the Inland company, which has also been a subject of recent negotiations, is expected to be an accomplished fact in the near future. The final settlement of the terms of sale awaits the completion of auditing work now under way.

Zinc Mines to Close One Week

ST. LOUIS, Oct. 30.—Approximately 65 per cent of the mines in the tri-state district, embracing southwest Missouri, southeast Kansas and northwest Oklahoma, will close for one week, beginning Nov. 3, to reduce surplus stocks of zinc in the hope of bettering the ore market. According to word received here today from Joplin, Mo., last week's purchase of zinc by the smelters, 19,500 tons, was the heaviest in six weeks. The ore sold at $40 per ton.

Zinc producers believe the smelters now have more ore on hand than they need to supply their demands and that this is likely to lead to a decline in ore prices unless production is curtailed. Then, too, the operator's surplus stocks have been increasing at the rate of 3000 tons weekly. Two or three weeks ago operators curtailed production and ore prices advanced.

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Causes of Industrial Depression

THE course of commercial and industrial activity in the United States in the past five months has been of distinctly novel character. It is doubtful whether it is yet fully recognized how lacking in precedent this period has been, but the change in business sentiment in the past few weeks shows that some thinking has been done.

We have had a period in which commercial activity, or the making of engagements, has apparently been light, while industrial activity has been heavy. In the latter there has been little if any diminution, as indicated by statistics of bank debits, car loadings, employment and other indexes, while on the other hand contracting for construction and other work and buying commodities for forward delivery has been light. It is not a case of industrial activity running on its momentum, for when it is a case of momentum, steel is always a good example. Often the steel industry has run along smoothly on momentum for a given time and then suddenly lost the momentum. In recent weeks, steel mill operations, even in the case of the Steel Corporation, have been based chiefly upon current and recent orders rather than upon old contracts.

For more months than they would care to admit publicly, many business men have felt that an industrial depression was coming, and their concern has been simply to guess the time and to be prepared for it. The course of affairs lately now disposes these men to doubt whether their original conclusion was correct. Some have settled the matter temporarily to their own satisfaction by adopting the idea that there will be simply a little reaction and readjustment. That is not very safe, however, since experience shows that when once reaction has begun, it is particularly difficult to forecast its extent.

The various causes of industrial depression in past experiences may well be reviewed afresh and set against conditions as they are seen to exist. One very familiar cause is excess of construction work in providing facilities that cannot begin promptly to yield an adequate return. A chart in the October survey of business by the Department of Commerce is suggestive in this connection. It shows, on the square foot basis, the volume of building contracts awarded since Jan. 1, 1919, by character. There is seen to have been much activity in 1919 and the fore part of 1920 in industrial building, and relatively little since then. In residential building, on the contrary, there was not so much in that earlier period, while there was an enormous volume from March, 1922, to May, 1923, inclusive. That is, it looks as if there had been in general no unsafe expansion in manufacturing facilities of late. In residential building an excess would hardly make much trouble, while it is not known that there has been an excess.

Sometimes public utilities have expanded too rapidly for the growth of the country. No one thinks that is the case now. The utilities have had difficulty in securing capital and the common view is that greater expansion would be advantageous.

On the other hand, we may be less safe than we think we are in the matter of credit. Overstrain of credit has been a familiar cause of industrial depression and even of panic. We assume that we are safe from that on account of the Federal Reserve System. Times have come in the past when men wanted to borrow and could not. Now, we maintain, they will always be able to borrow, but there is another point, for they may not want to borrow. The net result would not be wholly different.

REVISED figures of the financial damage of the Japanese disaster show that the reconstructive effort need not be so great as was at first feared. Figures published in our columns last week placed the total loss at $915,000,000, of which about 80 per cent will be largely recoverable by the expenditure of effort or work, rather than investment in raw material. Most of the materials used also will again represent Japanese production and not imports. The figure given above, divided by the population of Japan proper, indicates a loss of approximately $16 per inhabitant. This is but a fraction of the per capita taxes in Great Britain for the current year, and may be compared with the total annual tax bill of the American people, which is nearly $100 per person.

Unemployment Insurance

SOME years ago certain reformers undertook a drive which, had it been successful, would have established a system of health insurance for all workers in American industrial plants on a basis similar to that of workmen's compensation. The insurance was against loss to employees through idleness resulting from accidents sustained in industry, and in some cases from occupational diseases. The effort failed, because the cause was unable to stand against the analysis to which it was subjected.

Today a similar effort is making to secure the enactment of State laws establishing unemployment insurance. Under this every idle worker in industry would be compensated for lost time. The system has been in practice in Great Britain for several years. The strongest adherents it has left are the always present small army of people whose idea of happiness is not continuous employment but continuous unemployment. The "dole" system is branded by American investigators who have studied it on the ground, and by even Lloyd George himself, as expressed in a recent utterance, as a colossal mistake, which should not be transplanted to America. Frank F. Dresser, counsel for the Associated Industries of Massachusetts, in an address at the recent annual meeting of the organization, summed up the American unemployment insurance situation as follows:

> They, like the former health insurance bills, are fatally defective in being measures of relief rather than of prevention: that they are palliative merely. They fail to distinguish between unemployment in normal and in abnormal times. As applied to unemployment in normal times they benefit the incompetents and the "won't works" at the cost of the thrifty and industrious, and interfere unduly with the proper conduct of business and with the liberty of the worker himself. As applied to unemployment in abnormal times, I am not prepared to say that some organized measures of relief may not be proper and possible.

In normal times, there are unemployed because of lack of work and exclusive of illness and labor disputes about 10 per cent of the working force. Unemployment due to recurring crises of business depression cannot be so surely analyzed, for elements over which an individual employer has no control play a great part and are not yet understood. Fiscal policies, foreign trade, legislation, all contribute, as well as the psychology of inflation and deflation. Such depressions throw out of work 25 to 30 per cent of the average working force, and a much greater proportion in some industries, and affect not only the workers who are always on the ragged edge of unemployment, but those who are always at work when there is work to do.

It is contended by proponents of bills which will come before the legislatures of Pennsylvania, Massachusetts and Wisconsin that the way to solve the problem of unemployment is to provide a fund in which the three interested parties, the worker, the employee and the public shall contribute, from which payments shall be made to the worker during periods of idleness. The opponents of the measure are not prepared to accept this proposition. In the first place, they hold that a sharp distinction should be made between unemployment in normal times, and unemployment in abnormal times, when general business conditions involve a very great degree of unemployment.

We may be a long way from the passage of the proposed legislation, but if the intention is to force it upon industry rapidly without much consultation with industry, then it would be well for the manufacturer to consider from now on how the two types of unemployment may be successfully differentiated. It would be a service to all to give, through the medium of the printed word, what opinions the reader of these lines holds on a baffling question of no small importance.

Enlarging the Influence of the Institute

THE effort of the directors of the American Iron and Steel Institute to obtain a larger attendance of members to listen to the papers following the usual presidential address of Judge Gary at the opening session of the semi-annual meetings is worthy of hearty commendation. There is probably no other association in the country at whose meetings less than a third of those in attendance listen to the proceedings after the opening address. To one who for the first time attends a meeting of the American Iron and Steel Institute, the exodus of members to the corridors upon the conclusion of the president's speech is indeed surprising.

This withdrawal is not, however, a reflection upon the value of the papers or the ability and painstaking care in preparation of the authors. It is due to the fact that the membership is composed of three classes: the executives, who are not primarily interested in engineering or highly technical discussions; the sellers, who likewise have little interest in engineering problems; and the operating officials and engineers, whose life work is concentrated in large part upon metallurgical, chemical and other technical problems.

In this day of specialization it is futile to expect to find all members equally interested in all the subjects that can be discussed. How, then, can a larger attendance be assured through a greater part of the sessions of the institute?

THE IRON AGE believes that a very large increase in the attendance through the morning session could be obtained by changing the program so that, after the delivery of the presidential address, a short time—perhaps half an hour—could be devoted to searching discussions of the subjects treated in the address. Possibly it would be well to select two or three men to lead in this discussion, but this part of the program need not be cut and dried.

If it were understood that the directors earnestly desired discussion, it would probably be forthcoming. For example, in the case of the address last Thursday by Judge Gary, much additional information might have been offered as to the abolishing of the twelve-hour day and doubtless some of the leaders of the industry would have had much valuable comment to offer in regard to that subject and other features of the address. This discussion might well be followed by a paper on "How to Make the Eight-Hour Day Permanent."

The speakers Thursday treated the abolishing of the long day as an accomplished fact, and it

is, so far as the introduction of shorter hours in many important plants is concerned, but it is by no means certain that the shorter hours would stand the test of such great demand for production as we saw during the World War and at other times. To make the short day permanent, all employers and employees must be as enthusiastically in favor of it as most of them are today. How can this be brought about? The subject is one that should receive earnest attention.

Papers and discussions on economic and commercial problems might well continue through the remainder of the morning. An organization of the size and importance of the institute would have no difficulty in obtaining talent of the highest order to contribute to the program, and we venture the prediction that no urging would be needed to insure the attendance of a very large percentage of the members.

As to the technical papers, we believe they might well be confined to the afternoon session, when those primarily interested would be glad to attend, especially if a little spice in the way of lively discussion were added.

On the whole, the American Iron and Steel Institute is doing splendid work. Its statistics are of great importance and have been increasing in their comprehensiveness, and the meetings have done much to add to the prestige of the great iron and steel industry, but much more could be accomplished by making some modifications in the programs of the meetings.

We are offering the above observations in a suggestive way. They are not intended to be the last word on this subject and we shall be glad to hear from our readers who may approve or disapprove of the ideas expressed, and especially from those who have further suggestions to make.

CORRESPONDENCE

Nickel Steel Direct from the Ore

To the Editor: In the interest of historical accuracy I wish to correct an error in the interesting article by F. H. Mason, published in THE IRON AGE Sept. 20, on the "Production of Nickel Steel Direct from the Ore."

I was president of the Lake Superior Corporation and of the Algoma Steel Corporation where these investigations were conducted. I offered Dr. Haanel free the use of the electric current and of the factory accommodation necessary to demonstrate a type of electric furnace with which he desired to experiment in the reduction of ores. I also offered the services of my technical staff at the head of which was E. J. Sjostedt, and under Mr. Sjostedt's direction the Haanel furnace was erected and operated.

Years previous to this experiment I had purchased nickel properties in the Sudbury district for the Lake Superior Corporation, had opened mines, shipped ore to our Sault Ste. Marie works, erected crushing, pulverizing and roasting plants, utilized the sulphurous gases in the production of sulphite wood pulp, produced ferronickel in the electric furnace direct from the ore in cast bars and had received from the Paris Exhibition of 1900 a medal for the first production of ferronickel pig in the electric furnace under the name of "Clergite." All of this was original investigation and experiment by Mr. Sjostedt under my direction, and had all been accomplished a considerable time before we undertook the experiment with Dr. Haanel's furnace, which, however, we actually ran for some time on our own account after Dr. Haanel discontinued his demonstration work.

Mr. Mason has reversed the sequence of events: Dr. Haanel's experiment had not for its object the proof that nickel ore could be smelted into metallic ferronickel in the electric furnace. This we had accomplished years before; its purpose was to demonstrate that this object could be accomplished economically on a commercial scale in Dr. Haanel's furnace.

F. H. CLERGUE.

Montreal, Oct. 19.

Power Plant Problems of Steel Mills

To the Editor: In his article [page 1027, THE IRON AGE, Oct. 18] Mr. Breedlove does not give any efficiency figures, except that he mentions that the surplus gas from one 500-ton blast furnace will supply enough furnace gas over the stove requirements to operate one of the 2250-hp. units continuously at 165 per cent rating —in other words, should produce 3712 b.hp. per hour.. This figure is considerably below what is actually being obtained. For a coke rate of 2000 lb., 4250 b.hp. can easily be obtained with good combustion efficiency. H. C. Siebert in his very able paper on the "Economical Use of Fuel in the Steel Plant," before the Association of Iron and Steel Electrical Engineers at Buffalo, even puts this figure at 5070 b.hp.

In all his tables, Mr. Breedlove compares six gas-fired and four stoker-fired boilers with five gas and pulverized coal-fired boilers for a station capacity of 30,000 kw. This is unduly favoring the combination of gas and pulverized coal.

The Bethlehem Steel Co. at Sparrows Point, Md., has, for a station capacity of 10,000 kw., two 1291-hp. Babcock & Wilcox gas-fired boilers equipped in such a manner that each is capable of developing steam for the full station capacity. With modern equipment for the combustion of blast furnace gas, boilers of the Babcock & Wilcox type or Hornsby-Bigelow type can safely be operated on loads up to 300 per cent on gas alone, with excellent efficiency.

I differ from Mr. Breedlove in his statement that it would be possible to burn five fuels (blast furnace gas, coke oven gas, tar, coke and coal) simultaneously with good efficiency. Blast furnace gas can be burned with fair efficiency in connection with powdered coal and perhaps with tar, but that the possibility should exist to obtain an efficiency of 80 per cent with any kind of mixed firing I very much doubt. Such efficiency can today be obtained continuously on blast furnace gas alone.

To get a just comparison between gas-fired and stoker-fired boilers on the one hand, and gas and powdered coal on the other hand, he should readjust his figures by giving proper credit for the power which it is possible to generate from blast furnace gas alone. I believe that Table XVII, Scheme 2, in Mr. Siebert's paper would answer his purpose. I reproduce this table, which refers to a 500-ton blast furnace, as follows:

Million B.t.u. in gas from furnace per hour..	280.90
Million B.t.u. required by stoves at 80 per cent efficiency	68.76
Million B.t.u. required by blowing engines per hour	40.96
Million B.t.u. available per hour for power production	171.18
Thermal efficiency of steam plant, per cent, boiler	80
Thermal efficiency of steam plant, per cent, turbine	22
Total thermal efficiency of plant per kwhr., per cent	17.6
On the surplus heat, current can be produced at hourly rate of	8,800 kw.

In my opinion the most economical equipment for a plant requiring 17,500 b.hp. per hour and operating two 500-ton blast furnaces would be two 2250-hp. boilers equipped for gas alone, two 2250-hp. boilers equipped for powdered coal alone and one 2250-hp. boiler equipped for both gas and powdered coal, to serve as a standby for the two other units.

K. HUESSENER,
Manager, American Heat Economy Bureau.

Pittsburgh, Oct. 25.

Grading of General Electric Employees

West Lynn Official Tells of System for Selecting New Workers and Promoting Old Ones at Convention of Associated Industries of Massachusetts

THE General Electric Co. some time ago put into effect a shop representation plan which has been tremendously popular and successful throughout its West Lynn, Mass., plant. The company recently instituted a system for selecting new employees and promoting old ones, under which applicants for work are tried on sample jobs. Jeremiah O'Connor of that company told about the plan at the eight annual meeting of the Associated Industries of Massachusetts held Wednesday and Thursday, Oct. 24 and 25 at the Copley-Plaza Hotel, Boston. Mr. O'Connor said:

"Nine months ago we formed in the West Lynn Works of the General Electric Co. a new department whose sole duty it would be to see that the right person was put on the right job, and, if possible, to develop a more or less scientific objective method of doing this, which could be applied by anyone with a fair degree of accuracy. The ideal way, of course, would be to try every person on every job. But as this is out of the question we have made some 35 sample jobs, each one requiring about five minutes, on which we try every new worker. When possible, we re-place each on the kind of work for which the sample job shows him best fitted.

"Take, for instance, inspection work. We have filled a drawer with fifteen to twenty familiar objects: a ruler, a pen, nickel, book, envelope, etc. This we show to a man for one minute, and at the end of the minute cover the drawer and take something out, or merely change the position of one or two objects, and then ask the man what has been taken out or changed. Those men whom we know are our best inspectors can name instantly the change which has been made, whereas the average man will miss from twenty-five to fifty per cent of the changes.

"Several months ago we had an opportunity to select four girls for the same type of inspection work. The girls were first selected very carefully by the employment department and then approved by the foreman. The four were then given this sample inspection job to do. Two of the girls did it almost perfectly and were given an A grade on the test, which is the highest mark obtainable. The other two girls were given a grade of D, the lowest mark given. All four girls were then put on the same kind of inspection work in the factory. One of the girls who got a D left of her own accord at the end of five days, saying that she did not like the work. Both the instructor and her foreman said that she was obviously unfitted for inspection work, and that they realized this very quickly after watching her on the job.

"The second girl who failed to pass the test was kept on inspection work for six weeks and then let go. The foreman said that she had done nothing of value, and that everything she had inspected had to be re-inspected by another girl. The two girls who passed the test with a grade of A are still in the factory and are doing good inspection work.

Tried on Assembly Jobs

"Another job which we give a new employee to do is to assemble nine blocks into a single block. Those men whom we know have mechanical ability, or are mechanically ingenious, can assemble this block in less than three minutes. Those men whom we know are not mechanical require invariably more than five minutes. After two hundred men had taken this test we graded them A, B, C and D, according to the length of time required. We then asked ten foremen and department heads to grade these same men according to what they considered their mechanical ingenuity or ability to think mechanically. Every man who got an A on the test was graded by the foremen either A or B, that is, as above the average. With one exception, every man who got D on the test was graded either C or D by the foremen, that is, as below the average. One man who got D on the test was graded B by the foremen. Every man who was graded A in mechanical ingenuity by the foremen obtained A in the test. Thus, if we choose for jobs requiring mechanical ability only those men who got A in the test, we pick only men whom the foremen consider to be above the average in mechanical ability, and we do an injustice to no one because we include all those men whom the foremen and department heads consider to be of A grade.

"Another sample job which we ask new operators to do is to put three hundred pegs into one hundred holes in a board. Girls who we know are fast with their hands and who are making high piece work earnings, will do it in less than seven minutes. Another sample job is to pick up one hundred of these same pegs with tweezers and put them into a hundred holes.

New Operators Carefully Tested

"All new operators who enter the West Lynn plant are carefully tested by these sample jobs and only those are engaged who can do well the sample, which represents the type of work on which they are to be placed. In addition to this, we are testing every person in the plant also who is not making good, and who is about to be laid off, in the hope that we may find some type of work on which he will succeed.

"An interesting case was a girl who had been with the company for nearly a year and been tried out on three different jobs, but had not made good on any of them. She was about to be laid off, and so was sent into the new department to be tested. She was extremely slow and awkward in using her hands, and all the jobs on which she had been tried during her year of employment had required quickness and dexterity. She was, however, unusually good on the sample inspection job. Instead of laying her off we made her an inspector. She has now been on the job for several months, and although the foreman did not want to take her at the beginning, realizing she had not made good in other departments, he now says she is as good an inspector as he has.

"In addition to this, the new department has been open to anyone in the plant who wished to come in and try the sample jobs. So far approximately 450 persons have voluntarily availed themselves of this opportunity and new men and girls are every day asking to come in. Whenever there is an opening anywhere in the plant, the new department is given an opportunity to recommend two or three men for the vacancy. In this way a large percentage of the openings are filled by men whose qualifications we know, and we are very often able to promote a man in the plant, rather than go outside and hire a new person. As a result, some thirty-five men and girls have been promoted with an average increase in pay of 90c. per week for each person. In addition to this, several of the girls have been changed from piece work to salary time with a consequent reduction in hours per week from forty-eight to forty-four.

A Test for Clerical Work

"One of the foremen who put up a sign in his department saying that he wished a clerk for his office, and that anyone in his department who wished to try the sample clerical job could do so, and he would choose one of those recommended by the test. Twelve girls applied for the job and took the test, and of the twelve, two were recommended to him. He took one

of them and a department head took the other. Both girls had been working on machine glass work for several years, but were anxious to get office work. If it had not been for the tests, they probably would have continued on machine glass work for many years. They are both unusually good clerks.

"Still another way of using the new department is in advising men of their own strong and weak points, and in helping them to overcome their weak ones. Any man who comes to the new department with a definite idea of what he would like to do is tried out on the sample jobs and told whether or not he is fitted for the type of work he wishes. If he is not, the department tries to tell him how, if possible, he can fit himself for the work.

"Since the formation of the new department nine months ago, about 100 persons have been tested before being hired. Two-thirds of these have performed satisfactorily the sample job covering their new work. The remaining third failed on the sample job, but seemed in every other way so well fitted that they were hired despite their failure. Of those who passed the tests with an A grade, 95 per cent are now doing excellent A grade work. Of those who failed in the tests, but were hired despite this fact, only 18 per cent have made good."

Clifford S. Anderson Elected President

Clifford S. Anderson, assistant secretary and counsel Norton Co., Worcester, was elected president of the Associated Industries of Massachusetts, to succeed Col. Charles R. Gow. Mr. Anderson is the first president to be elected who resides outside of Boston. He is a native of Portland, Me., and has resided in Worcester since 1903. He was graduated from Worcester Academy in 1896, from Brown University, Providence, R. I., in 1900, and from the Harvard Law School, Cambridge, Mass., in 1903.

Mr. Anderson and the following were elected members of the executive committee, which is comprised of forty members: Frank P. Cox, manager General Electric Co., West Lynn; Lewis E. Bellows, president Walden-Worcester, Inc., Worcester; Francis G. Echols, vice-president and general manager Greenfield Tap & Die Corporation, Greenfield; Frederick Fosdick, president Fitchburg Steam Engine Co., Fitchburg; Jerome R. George, vice-president Morgan Construction Co., Worcester; Eben S. Keith, president Keith Car & Mfg. Co., Sagamore; Theodore W. Little, vice-president Walworth Mfg. Co., Boston; Charles L. Newcomb, manager Worthington Pump & Machinery Corporation, Holyoke; E. Kent Swift, treasurer and general manager Whitin Machine Works, Whitinsville; John F. Tinsley, vice-president and general manager Crompton & Knowles Loom Works, Worcester; and Reginald Washburn, president Wire Goods Co., Worcester.

Exhibit of Results of Research Work

A new feature of the annual meeting was a special exhibit in the salon of the results obtained by research work. This exhibit was arranged by Skinner, Sherman & Esselen, Inc., Boston, and several firms contributed toward it. There was a demonstration of what research and chemistry has done in the saving of waste material and making something useful out of it.

There were four section conferences—on taxation, on finance, on industrial relations and on technical procedure in business—with many speakers on each topic discussed. In the fourth group, Dr. Gustavus J. Esselen, Jr., Boston, delivered an address on "Front Office Chemistry," showing the importance of chemistry in industry, in management problems and profits.

BETHLEHEM EARNINGS DECLINE

Total for Third Quarter Is $10,518,951—Surplus After Dividends, $1,074,655

Total net earnings of the Bethlehem Steel Corporation for the September quarter were reported at $10,518,951, compared with $11,601,682 for the preceding quarter, when the policy of issuing quarterly statements was inaugurated. After the payment of regular dividends on the preferred and common stock, there remained a surplus of $1,074,655. This figure is considerably below the surplus for the June quarter which was $2,102,262.

Directors declared the regular quarterly disbursement of 1¼ per cent for the current quarter, payable Jan. 2, to stockholders of record Dec. 1. Net income of $4,400,603, after interest, depreciation, depletion, etc., for the September quarter, was equivalent after preferred dividends to $1.84 per share on $180,151,900 outstanding common stock, against $2.42 per share earned in the preceding quarter.

The value of the company's unfilled orders on hand Sept. 30 was $53,134,000 compared with $80,066,000 reported on June 30, and $67,510,007 on Dec. 31, 1922. The income account for the September quarter compared with that of the June quarter is as follows:

	September	June
Total net	$10,518,951	$11,601,682
Int. chgs., bonds disc., etc.	3,197,837	3,245,082
Dep. and depletion	2,920,511	2,930,129
Net income	4,400,603	5,426,471
Pfd. dividends	1,080,207	1,079,851
Com. dividends	2,245,741	2,244,358
Surplus	1,074,655	2,102,262

President Eugene G. Grace did not attend the meeting on account of illness. His place was taken by Vice-President H. E. Lewis, who stated that there has been a noticeable improvement in new business, particularly with respect to the railroads which are buying rails and accessories in good quantities.

"A very good tone," said Mr. Lewis, "is also evident in the tin plate, sheet and wire end of the business, with structural tonnages also picking up. October operations also indicate an improvement over September, the company's steel plants showing practically a 75 per cent operation. The rail mill at Sparrows Point, Md., is again resuming the rolling of rails after being shut down since April, 1919."

Mr. Lewis stated that the Bethlehem company is planning to increase the tin plate plant at Sparrows Point, but not in the immediate future. He denied rumors that it was planned to shut down the greater part of the Lackawanna plant at Buffalo. No new financing is contemplated by the company, according to Charles M. Schwab, chairman of the board, who presided at the meeting of directors.

Production of Electrical Machinery

Figures of the Census Bureau for the year 1921 show 1333 establishments engaged in making electrical machinery, apparatus and supplies. The total number of persons engaged in the industry is given as 218,660, of whom 161,204 were wage earners receiving a total wage of $194,242,357, or an average of $1,205 each. The value of products is reported at $833,985,443. Taking out costs of materials, the value added by the manufacturing process amounted to $489,915,480, or an average per wage earner of $3,039.

All of these figures are lower than the corresponding figures of 1919—due to the business depression in 1921. All, however, are much higher than the corresponding figures of either 1914 or 1909. Leading States in order of value of product include Illinois, New York, Pennsylvania, Ohio, New Jersey and Massachusetts. Each of these produced more than $72,000,000, while no other State reached $35,000,000. In the list of products by class, telephone apparatus at $102,000,000 takes the lead, with insulated wire and cables at $98,300,000 in second position, and motors, not including starters or controllers, at $83,000,000, in third. No other item reached $60,000,000.

FLOATING STEEL TANK ROOF

Used Over Oil and Gasoline Tanks to Minimize Both Fire Hazard and Evaporation

Fire tests were conducted Oct. 16 at the Chicago Bridge & Iron Works to show the ability of the Wiggins floating welded steel roof for oil and gasoline tanks to protect the tank contents against fire. Built for experimental purposes, this roof was floated on the surface of gasoline contained in a steel tank 30 ft. in diameter and 6 ft. high.

On top of 3 ft. of water in the tank was gasoline with an average depth of 2½ to 3 in. There is a gastight space between the vertical rim of the floating roof and the shoe which presses against the tank shell. This forms the only air space between the liquid surface and the roof, and its size is in marked contrast with the great volume of evaporation—encouraging air in the tank with a canopy roof.

Fire was applied to the aperture between the shoe and shell without fire resulting. Fire applied by blow torch to one of the four 3-in. vents in the horizontal ignited the mixture between the vertical rim and the shoe. Smoke and flame belched forth from the vents, but there was no permanent fire. This test proved that fire resulting from a lightning flash or flame from any source would be only momentary and would cause no damage. Burning waste dropped down the vent caused a similar result.

When a fire was built in the center of the tank by igniting a bucket of gasoline which had been poured on the roof, the gasoline in the tank was not ignited, although the fire on the roof lasted 5 min. and caused flames to shoot up 8 ft. or more. Then gasoline poured around the horizontal and around the edge of the float was ignited; it burned for 8 min. but did not ignite the gasoline in the tank.

Gasoline poured down into the aperture between the roof and shell was ignited and burned; this ignited the mixture between vertical rim and shoe, but only for a moment. The gasoline which had been poured into the aperture continued to burn for 5 min. or so but did not ignite the contents of the tank.

Demonstration of a Foamite hand extinguisher showed that one man could close the opening between tank shell and roof in about 1½ min.

One great value in this roof is the practical elimination of evaporation, which now costs the oil industry about $200,000,000 a year.

Pig Iron from Copper Blast Furnace Slag

"We have produced pig iron at Anyox on a small scale and are still doing it. Whether we shall be able to produce it on a commercial basis remains to be seen, but our technical staff is working hard in the hope that this may prove to be the case." The foregoing announcement by H. S. Munroe, managing director of the Granby Consolidated Mining, Smelting & Power Co., is one of considerable interest and one that may lead to important results. Mr. Munroe was not prepared to go into details of the process of manufacture at this stage, but he went so far as to say that the iron was being made from copper blast-furnace slag and that it was being made in a reverberatory furnace. On a general average, the Granby company produces about 400 tons of furnace slag per day, the iron content of which averages 52 per cent. The principal other ingredients are silica, lime, and alumina. In the past this slag has been an entirely waste product, and its disposal has been a matter of some cost to the company. If in the future this can be turned to useful purpose in the manufacture of pig iron it should materially reduce the cost of copper production at the Anyox smelter.

A little more than a year ago S. G. Blaylock, managing director of the Consolidated Mining & Smelting Co., announced that iron had been prduced electrolytically on a laboratory scale from the tailing of the company's Sullivan mine ore. Since that time the company has been bending its energies in the construction of the new mill at the Sullivan mine and in the erection of a new plant at the Trail smelter to cope with the increased output from the Sullivan mine. The mill was put into operation at the end of last August, the new plant at the smelter is all in place, and now the technical staff at the smelter may be expected to turn its attention to the production of iron on a commercial scale from the Sullivan ore tailing. The Sullivan mill is producing more than 1000 tons of tailing daily, which is composed mainly of the minerals pyrite and pyrrhotite and will contain on an average in the neighborhood of 45 per cent of iron. The original ore is composed of zinc-blende, marmatite, galena, pyrrhotite, pyrite and from 3 to 6 per cent of earthy gangue. At the present time these two companies, the Granby and the Consolidated, are dumping in the form of slag and tailing more than 200,000 tons of metallic iron annually, which, if commercial processes can be devised for its recovery, would be more than sufficient to meet the Province's iron and steel needs for some years to come.

Recovering Coal from Ashes Electromagnetically

WASHINGTON, Oct. 30.—The Friedrich Krupp A. G., Grusonwerk at Magdeburg, Germany, has introduced a simple electromagnetic "dry separating process" which it claims is capable of recovering coke and unburned coal from ashes from industrial firing, at the same time avoiding losses and other disadvantages attaching to previously known processes, says a report received by the Department of Commerce from Assistant Trade Commissioner W. T. Daugherty, Berlin.

The process is based on the fact that hard coal slag responds to attraction in a highly concentrated magnetic field, while coal and coke do not. This striking difference in behavior in the magnetic field is explained by the fact that when the coal is burned even if finely ground, the iron-containing non-magnetic materials are transformed to magnetic iron compounds, which go over into the slag making it responsive to magnetic attraction. Many experiments which the Gruson works has tried with different kinds of coal have shown that an average of 30 per cent weight of coal ashes is recoverable as coke and coal.

Operations Reduced at Duquesne Works

Last week notices were posted in six of the seven merchant bar mills at the Duquesne, Pa., steel works of the Carnegie Steel Co., that one shift of men will be eliminated beginning this week. This will reduce the employment by one-third in these mills and is the first real retrenchment by the Steel Corporation in the Pittsburgh district. There have been three shifts of eight hours each. The shift from 11 p.m. to 7 a.m. has been eliminated. This group is known as the lower works of the Duquesne plant.

Industrial Plants

In volume No. 3 Charles T. Main, industrial engineer, Boston, shows principally by illustration a large number of textile mills, power plants and miscellaneous manufacturing buildings which have been erected from designs and specifications prepared in his office. Most of these have been in New England and along the Atlantic Coast as far south as Baltimore, but one big power development is shown in Montana and a jute mill in India. The book contains 88 pages, 8¾ x 7¼ in., and features 47 plants.

Electric House Pumping Systems

Under the above title the engineering department of Purdue University has published Bulletin No. 4 dealing with water supply systems operated by electric motors for the use of farms and other outlying property. Conceivably the information might be of great interest to manufacturing plants located away from city water supplies. The pamphlet has 30 pages and includes results of a number of tests.

Iron and Steel Exports 11,000 Tons Higher

September Shows Best Tonnage, with Two Exceptions, Since June, 1922—Japan Buying Heavily— Imports Lowest in 17 Months

WASHINGTON, Oct. 30.—Iron and steel exports in September totaled 172,499 gross tons, valued at $19,871,060, as compared with 161,426 tons in August, valued at $19,402,293, and represented the largest foreign movement for any month since May, when they aggregated 203,389 tons. The increase was largely due to heavier purchases by Japan of black steel sheets, tin plate, steel rails and galvanized wire. Exports of machinery showed a decline in September, being valued at $25,555,407 as against $28,240,760 in August.

Imports in September, amounting to 36,611 tons, valued at $1,785,166, were the lowest since April, 1922, when they amounted to 18,417 tons. The decline is apparently due to the sharp drop in imports of pig iron. Imports in August amounted to 45,439 tons, valued at $2,475,512. Exports of machine tools in September totaled 3744 in number, valued at $513,461, as compared with 19,022, valued at $1,018,613, in August. Imports of machinery in September declined to a value of $518,860 as against $602,665 in August.

For the nine months ended with September of this year, exports of iron and steel totaled 1,475,494 tons, valued at $171,627,880, as against 1,575,399 tons, valued at $143,397,169, for the corresponding period of last year, while exports in September of last year amounted to 129,475 tons, valued at $14,381,877.

For the nine months ended with September of this year imports totaled 651,344 tons, valued at $25,204,949, as against 301,987 tons, valued at $18,387,707, for the corresponding period of last year. Heavy iron ore imports accounted for much of the increase. For September of last year imports totaled 76,393 tons, valued at $3,220,537. Imports of manganese ore in September increased to 35,175 tons as against 23,026 tons in August, while imports of iron ore, amounting to 261,609 tons, showed a slight decline under the August total of 267,677 tons.

The largest single item of export in September was steel rails, foreign shipments of which amounted to 32,772 tons; Canada was the greatest buyer, taking 12,266 tons, with Japan ranking second with 8870 tons. For the nine-months period, shipments of steel rails to Canada totaled 43,966 tons, Japan leading for this period with 58,623 tons. Of the 8227 tons of black steel sheets exported in September, Japan, the heaviest buyer, took 3561 tons, as against 3254 tons for Canada, ranking second.

Pig iron imports declined to 8353 tons in September, of which 6200 tons came from England, which has provided 170,660 tons out of the total pig iron imports of 336,817 for the nine months ended with September.

Sources of American Imports of Pig Iron
(In Gross Tons)

	Sept., 1923	Nine Months Ended Sept., 1923		Sept., 1923	Nine Months Ended Sept., 1923
England	6,200	170,660	Scotland	....	16,771
Canada	822	41,680	Mexico	....	1
British India	786	14,766	Germany	....	20,740
Belgium	395	13,216	Austria	....	299
China	150	1,375			
Sweden	....	705	Total	8,353	336,817
France	....	56,604			

Exports of Iron and Steel
(In Gross Tons)

	September		Nine Months Ended September	
	1922	1923	1922	1923
Pig iron	5,203	2,148	22,767	23,076
Ferromanganese	70	45	1,054	3,265
Ferrosilicon	89	2	366	659
Scrap	2,419	9,681	55,303	49,214
Ingots, blooms, billets, sheet bar, skelp	6,810	8,366	83,231	87,967
Iron bars	....	630	....	11,314
Steel bars	10,881*	11,717	138,757*	122,840
Alloy steel bars	379	276	3,406	1,942
Wire rods	1,401	4,244	36,516	23,919
Plates, iron and steel	5,296	8,750	76,983	92,602
Sheets, galvanized	5,697	7,660	88,699	91,551
Sheets, black steel	9,231	8,227	197,888	77,415
Sheets, black iron	930	1,136	9,519	11,353
Hoops, bands, strip steel	2,502	3,349	24,959	29,857
Tin plate, terne plate, etc.	6,357	9,094	59,902	80,424
Structural shapes, plain material	10,898	9,984	96,696	101,010
Structural material, fabricated	3,054	9,790	35,135	59,809
Steel rails	18,451	32,772	220,472	197,822
Rail fastenings, switches, frogs, etc.	2,723	3,959	26,983	30,012
Boiler tubes, welded pipe and fittings	15,675	16,186	133,526	143,285
Cast iron pipe and fittings	2,218	2,983	19,488	20,880
Plain wire	4,667	7,976	91,412	70,182
Barbed wire and woven wire fencing	7,283	3,310	56,511	58,197
Wire cloth and screening	203	415	1,145	1,581
Wire rope	458	554	3,447	5,058
Wire nails	2,320	3,063	46,836	29,178
All other nails and tacks	659	634	6,642	6,748
Horseshoes	133	106	731	702
Bolts, nuts, rivets and washers, except track	1,404	1,567	13,270	14,234
Car wheels and axles	1,126	2,110	12,630	15,412
Iron castings	664	853	7,541	7,653
Steel castings	173	576	1,713	3,879
Forgings	91	336	1,726	2,454
Machine screws	10	....	145	....
Total	129,475	172,499	1,575,399	1,475,494

*Both iron and steel; they were not reported separately prior to Sept. 22, 1922.

Imports of Machinery
(By Value)

	September		Nine Months Ended September	
	1922	1923	1922	1923
Metal-working machine tools and parts	$20,950	$28,451	$167,465	$293,520
Agricultural machinery and implements	92,862	166,674	2,027,552	2,282,224
Electrical machinery and apparatus*	.....	8,502	.....	22,297
Other power generating machinery*	.....	110,753	.....	1,656,188
Other machinery	572,135	28,451	4,185,396	293,520
Vehicles, except agricultural	63,718	176,029	1,032,832	2,122,982
Total	$749,665	$518,860	$7,413,245	$6,670,731

*Not reported previous to Sept. 22, 1922.

Imports of Iron and Steel into the United States
(In Gross Tons)

	September		Nine Months Ended September	
	1922	1923	1922	1923
Pig iron	46,839	8,353	109,171	$36,817
Ferromanganese	10,718	8,756	72,011	73,650
Ferrosilicon	3,615	988	12,774	9,899
Scrap	12,224	10,608	60,087	151,370
Steel ingots, blooms, billets, slabs and steel bars	1,280	2,325	16,057	14,948
Rails and splice bars	705	2,423	21,866	22,522
Structural shapes	289	405	1,784	7,868
Boiler and other plates*	....	262	....	1,574
Sheets and saw plates	42	276	425	1,948
Bar iron	371	512	4,280	6,783
Tubular products*	....	261	....	3,288
Castings and forgings*	....	148	....	2,176
Nails and screws*	....	41	....	924
Tin plate	75	60	2,230	9,691
Bolts, nuts, rivets and washers*	....	5	....	155
Wire rods	235	827	1,302	3,022
Round iron and steel wire*	....	252	....	3,007
Flat wire and strip steel*	....	49	....	862
Wire rope and insulated wire, all kinds*	....	60	....	840
Total	76,393	36,611	301,987	651,344
Manganese ore	46,869	35,175	327,537	162,413
Iron ore	138,838	261,609	684,387	2,297,144
Magnesite	13,425	1,746	90,190	62,505

*Not reported separately previous to Sept. 22, 1922.

Machinery Exports

By Value

	September, 1922	September, 1923	Nine Months Ended September, 1922	Nine Months Ended September, 1923
Locomotives	$217,587	$288,172	$7,217,779	$3,271,115
Other Steam Engines	83,335	41,553	1,763,678	918,834
Boilers	168,054	261,288	846,839	984,867
Accessories and Parts	105,066	155,809	4,587,895	4,068,756
Automobile Engines	205,378	397,743	4,215,477	4,244,633
Other Internal Combustion Engines	362,939	561,065	3,187,666	5,280,357
Accessories and Parts for	266,424	375,318	2,026,127	2,605,083
Electric Locomotives	161,795	326,452	347,616	2,982,739
Other Electric Machinery and Apparatus	422,211	756,642	6,329,858	6,263,151
Excavating Machinery	159,902	52,438	1,136,844	1,137,434
Concrete Mixers	62,329	38,999	452,261	401,684
Road Making Machinery	121,043	164,840	794,454	1,341,792
Elevators and Elevator Machinery	275,983	437,329	1,848,362	3,038,724
Mining and Quarrying Machinery	611,245	890,724	4,612,246	7,257,070
Oil Well Machinery	248,829	415,002	3,228,115	4,705,854
Pumps	615,687	708,363	4,441,110	5,458,311
Lathes	54,874	102,321	571,772	639,417
Boring and Drilling Machines	40,628	54,392	436,726	488,022
Planers, Shapers and Slotters	15,758	30,057	209,539	193,392
Bending and Power Presses	11,085	66,664	273,787	260,041
Gear Cutters	14,667	11,144	91,835	128,096
Milling Machines	29,662	23,065	243,535	311,976
Thread Cutting and Screw Machines	22,924	19,490	140,045	402,156
Punching and Shearing Machines	7,171	5,605	119,678	132,647
Power Hammers	20,886	18,321	96,099	123,322
Rolling Machines	3,897	.....	159,016	18,849
Sharpening and Grinding Machines	56,468	114,779	575,803	771,298
Other Metal Working Machinery and Parts of	602,895	395,500	4,292,751	3,521,649
Textile Machinery	640,892	676,374	11,568,612	6,997,988
Sewing Machines	641,069	739,986	4,724,114	6,429,269
Shoe Machinery	74,349	106,633	750,882	1,051,595
Flour-Mill and Gristmill Machinery	28,920	135,897	870,557	865,573
Sugar-Mill Machinery	548,132	837,558	2,439,747	3,259,494
Paper and Pulp Mill Machinery	107,851	153,217	1,391,056	1,681,855
Sawmill Machinery	99,124	29,641	471,692	507,783
Other Woodworking Machinery	113,965	115,430	1,036,751	806,478
Refrigerating and Ice Making Machinery	119,692	160,785	1,406,821	1,712,086
Air Compressors	126,115	172,228	1,593,014	1,845,073
Typewriters	985,996	889,169	8,523,424	10,211,361
Power Laundry Machinery	66,063	63,508	501,158	745,739
Typesetting Machines	260,591	432,118	2,764,295	2,794,067
Printing Presses	173,152	373,415	2,627,527	3,304,875
Agricultural Machinery and Implements	2,514,718	5,522,863	19,051,718	40,001,188
All Other Machinery and Parts	7,699,857	8,433,510	62,807,967	71,596,685
Total	$19,169,208	$25,555,407	$176,776,248	$214,765,378

Exports, January, 1922, to September, 1923, Inclusive

(In Gross Tons)

	All Iron and Steel	Pig Iron	Semi-finished Material
*Average, 1912 to 1914	2,406,218	221,582	145,720
*Average, 1915 to 1918	5,295,333	438,462	1,468,026
Calendar year 1919	4,239,837	309,682	258,907
Fiscal year 1920	4,212,732	248,126	288,766
Calendar year 1920	4,961,851	217,958	216,873
Fiscal year 1921	4,168,619	129,541	82,549
Calendar year 1921	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,683
February	133,975	1,430	6,627
March	208,843	2,724	10,002
April	198,830	2,750	9,376
May	230,062	3,897	13,091
June	212,295	1,996	13,178
Fiscal year 1922	1,721,418	28,330	63,127
July	157,169	1,943	10,149
August	145,640	1,791	9,353
September	129,475	5,203	6,810
October	132,924	1,553	8,364
November	127,782	3,464	7,157
December	150,170	3,136	8,449
Calendar year 1922	1,986,297	30,922	107,201
January, 1923	123,190	2,482	10,563
February	133,902	2,786	7,733
March	163,920	2,881	11,416
April	177,471	1,844	11,247
May	203,389	1,848	12,824
June	171,183	2,960	9,652
Fiscal year 1923	1,816,329	31,891	113,377
July	168,558	2,966	6,480
August	161,426	3,117	9,684
September	172,499	2,148	8,366
Nine months	1,475,494	23,076	87,967

*Calendar years.

Imports of Iron and Steel in Gross Tons

(Monthly Average)

	Total Imports	Pig Iron	Ferro-alloys	Manganese Ore and Oxide*
1909 to 1913, incl	26,505	†14,132	....	....
1914 to 1918, incl	23,351	4,645	3,281	‡47,155
1919 to 1921, incl	23,901	5,708	3,710	37,115
1922	59,545	31,954	9,117	31,204
January, 1923	120,078	83,935	5,120	829
February	67,704	35,793	9,234	4,636
March	106,197	72,344	9,030	12,799
April	77,903	36,371	7,221	14,071
May	75,885	39,764	10,482	12,734
June	68,019	30,033	12,794	36,138
Six months' average	85,964	49,706	8,980	13,535
July	53,464	19,760	12,381	23,824
August	45,439	14,564	7,334	23,026
September	36,611	8,353	9,744	35,175

*Not included in "total imports."
†Includes ferroalloys.
‡Average for three years, 1916 to 1918 only.

Sources of American Imports of Iron Ore

(In Gross Tons)

	September 1922	September 1923	Nine Months Ended September 1922	Nine Months Ended September 1923
Spain	11,739	7,100	39,936	191,100
Sweden	33,856	75,542	219,808	674,624
Canada	346	580	1,754	23,959
Cuba	33,000	75,175	232,489	602,176
Other countries	59,897	103,212	190,400	805,285
Total	138,838	261,609	684,387	2,297,144

Machine Tool Exports

	Sept., 1923 Quantity	Sept., 1923 Value	Aug., 1923 Quantity	Aug., 1923 Value
Lathes	62	$102,321	95	$99,913
Boring and drilling machines	73	54,392	258	46,283
Planers, shapers and slotters	25	30,057	14	32,891
Bending and power presses	34	66,664	50	77,704
Gear cutters	68	11,144	59	22,131
Milling machines	17	23,065	28	48,481
Thread-cutting and screw machines	40	19,490	109	114,557
Punching and shearing machines	17	5,605	53	23,443
Power hammers	16	18,321	47	22,280
Rolling machines	....	....	1	1,100
Sharpening and grinding machines	469	114,779	852	93,670
Chucks, centering, lathe, drill and other metal-working tools	2,209	22,700	2,429	26,090
Pneumatic portable tools	714	44,923	15,027	410,070
Total	3,744	$513,461	19,022	$1,018,613

Exports by Countries of Destination

(In Gross Tons)

	September, 1923	Nine Months Ended September, 1923
Plates		
Canada	6,518	78,081
South America	144	1,043
Japan	80	692
Cuba	41	781
Philippine Islands	19	568
Mexico	14	521
Galvanized Sheets		
Canada	1,311	26,927
Cuba	846	10,376
Chile	845	2,687
Argentina	633	4,263
Philippine Islands	629	5,463
Central America	394	3,094
Japan	372	3,242
Mexico	359	4,692
Colombia	165	3,726
Black Steel Sheets		
Japan	3,561	23,468
Canada	3,254	42,252
Argentina	199	1,889
Cuba	38	1,453
Philippine Islands	16	176
Tin Plate		
Canada	2,596	22,008
Japan	2,301	20,335
Argentina	891	4,724
Uruguay	773	2,996
China	762	6,595
British India	496	3,427
Steel Rails		
Canada	12,266	43,966
Japan	8,870	58,623
Cuba	4,480	39,348
Chile	2,804	4,920
Brazil	413	3,146
Philippine Islands	263	3,609
Chosen (Korea)	....	9,004
Honduras	248	7,590
Kwang Tung	....	11,143

Washington Call for Conference to Discuss Japanese Business

WASHINGTON, Oct. 30.—Information to the effect that British iron and steel manufacturers, in particular, are making a determined drive for the Japanese market for reconstruction materials has brought about a call by Assistant Secretary of Commerce, J. Walter Drake, for a special conference of trade association executives here Friday, Nov. 2. The Department of Commerce is told that many British sales experts have been recalled from foreign fields and others taken from London for special work in Japan. The immense amount of rebuilding now under way makes Japan the prize market for exporters of building material, in particular. The plans outlined by the conferees will have a widespread effect upon all American industries exporting to Nippon.

Commenting upon the conference, Mr. Drake today said: "American goods are well liked in Japan, and manufacturers in this country can compete very favorably in prices and quality. However, we shall lose our opportunity if we sleep at the switch while other nations are very much awake."

Among the trade associations to participate in the conference are: American Hardware Manufacturers, Plate Glass Manufacturers of America, Enamel and Sanitary Ware Manufacturers, American Paper and Pulp Manufacturers Association, Tanners Council, National Boot and Shoe Manufacturers.

Meager Export Business

NEW YORK, Oct. 30.—Export business with Japan continues active with heavy inquiry in the market for a wide range of material and some purchases of black sheets, wire nails and pipe. One Japanese export house has booked 3500 kegs of nails, several hundred tons of light gage black sheets and a small tonnage of gas pipe in the past week. Most exporters are submitting quotations on tonnages of light rails. One of these tenders calls for 23 miles of 16-lb. sections and 15 miles of 20-lb sections, bids opening Nov. 7.

While manufacturers and exporters in the United States are bidding on sheets, nails and wire asked for by the Imperial Government, no action has yet been taken, according to officials of the Japanese government in this country, who are conferring at Washington on the proper method of handling this purchasing.

Japanese Government Sheet and Nail Inquiry

WASHINGTON, Oct. 30.—Announcement was made today by the Japanese Government through the Department of Commerce that bids from American manufacturers for 20,000 metric tons of black and galvanized sheets and 3000 tons of wire nails will be received up to Nov. 1. This material will be used in the reconstruction work. Specifications are as follows: 3500 tons plain galvanized sheets, B. W. G. 28 and 30, size 3 x 6 ft; 3500 tons corrugated galvanized sheets, B. W. G. 28 and 30, size 2.2 x 6 ft; 1300 tons black sheets 28 and 30 gage, size 3 x 6 ft; 3000 tons wire nails, 10 per cent of 5 in.; 10 per cent of 4 in.; 10 per cent of 3 in., 30 per cent of 2½ in.; 25 per cent of 2 in.; 10 per cent of 1½ in. and 5 per cent of 1 in.

The Ohio State Public Utilities Commission has suspended until Nov. 6, the effective date of the new schedules filed by railroads for increased rates on iron and steel products, with the probability that further suspension will be made pending joint hearing by State commissions and the Interstate Commerce Commission. The Ohio commission had set Oct. 29 as the date for hearing complaints from Cleveland and Youngstown steel producers against the new rates. The railroads have indicated their willingness to voluntarily suspend the rates until Feb. 4, 1924, providing a joint hearing is arranged between the State commissions and the Interstate Commerce Commission.

Need for Measuring Management

There is increasing need for more trustworthy evaluations of management, Prof. Joseph W. Roe, head of the department of industrial engineering, New York University, declared in an address before a joint management week meeting of the local sections of the American Society of Mechanical Engineers, the Taylor Society, Society of Industrial Engineers, National Association of Cost Accountants and American Management Association, held in the Engineering Societies Building, New York, Oct. 23.

Among the causes assigned by Professor Roe were the following:

The increasing scale of production. Mistakes in management are more disastrous now than when production was on a smaller scale.

The widening of competition to a national and even international basis. To compete with foreign labor American production facilities must be used to maximum advantage.

The narrowing margin of profit. In the easy-going days a generation or two ago, profits were large enough to permit inefficiencies of management which today would be fatal.

The development of management as a separate function. Formerly the manager was usually the owner. Now, more and more, he is acting for others who are the owners, and is responsible to them. It is desirable that the owners have better means for gaging the effectiveness with which their business is being managed, and that the managers be able to prove their work to the owners.

The diversity of the points of view from which management is, and must be, judged. The interests and personal views of those making these judgments lead to different estimates for the same set of conditions. In so far as they can agree upon a common method, it will be a benefit to all.

The rapid development in management methods. New methods are being tried, some wise, some not. We should be able to determine their effectiveness quantitatively, if possible; to pass judgment on them on the basis of actual fact, instead of predisposition, enthusiasm or habit.

"It is a healthy sign," said Professor Roe, "that responsible industrial engineers and executives are the very ones who are most desirous to have their work measured. They are calling for it and will welcome it as a means for assisting them in their work."

Truscon Steel Co. Celebrates Its Twentieth Anniversary

Last week the Truscon Steel Co., Youngstown, celebrated the twentieth anniversary of its founding with a banquet attended by officials and employees and addressed by President Julius Kahn. He recounted the growth of the company from humble beginnings to its present annual gross business of approximately $20,000,000. In the course of his talk, Mr. Kahn stated there is scarcely a construction project in the country into which Kahn products do not enter in some way or other.

The original investment of $56,000 has expanded to gross assets of $15,500,000. It was stated that an initial investment of $5,000 at the start has expanded to $150,000 of stock without further cash investment, because of stock dividends.

Sales for the year to Oct. 23 were announced as $17,279,000, comparing with $13,322,729 in 1922, a low of $3,849,088 in 1914 and a high of $20,871,000 in 1920. The company received during the week a number of important orders, including one for $133,000 of metal sash from the National Tube Co. at Gary, Ind., and another for $55,000 from the Western Electric Co.

President Kahn received letters and telegrams of congratulation from a number of leaders in the steel industry. Talks were delivered by the sales managers of the company's various departments.

It was announced that the company has decided upon a substantial addition to its structural steel joist department, which will be ready next spring.

The company's principal properties are now located in Youngstown, and it operates a subsidiary plant in Japan. It has 18 warehouses and 43 branch offices in the United States, and employs normally about 2000 men.

INTEREST SHOWN IN WELDING

Industrial Applications Discussed at Three-Day Meeting of Welding Society—Other Features

The third fall meeting of the American Welding Society, held at the Fort Pitt Hotel, Pittsburgh, Oct. 24, 25 and 26, is regarded as one of the most successful thus far held. Many out of town members attended and the local sections were fully represented. The sessions brought home the fact that the applications of welding have greately increased during the past two years, and that the activities of the society are producing a spirit of cooperation among competitive manufacturers, as well as users, in the welding field, all of which is making for progress in the welding arts.

A report on the industrial applications of welding and its possibilities, presented at the second session by E. H. Ewertz, general manager Moore plant, Bethlehem Shipbuilding Co., included the possibilities of welding as a fabrication process and in the repair field. The possibilities of arc and oxy-acetylene welding and cutting were also discussed, and the use of thermit welding outlined. The report was illustrated by slides.

That the several welding methods outlined constituted one of the most important, far reaching and labor saving processes ever invented, was emphasized by Mr. Ewertz in his conclusion. The field of steel structures was said to offer an opportunity for welding far exceeding that of the present applications taken together. In answer to why more progress had not been made in that field, it was indicated that it was necessary first to prove that welding is better or cheaper or both. "This means," he said, "demonstration on a commercial scale. Some little start has been made with oil storage tanks in this country, with gas holders in Australia, and with small steel vessels, but the field of buildings is practically untouched, particularly as regards the possibilities of spot welding. Full information as to cost as well as design and procedure is lacking in small experimental structures already built." More thorough and comprehensive cooperation through the society was stated as necessary, Mr. Ewertz pointing out that it cannot be expected that a single builder should take the risk of failure and bear the cost of developing the technique of welded construction.

The relations of the society to industry were outlined in a paper by T. F. Barton, president. The technical activities of the society, most of the work of which is accomplished through 11 research subcommittees, was taken up in an address by W. Sparagen, secretary American Bureau of Welding, which is the research department of the society. Mr. Sparagen briefly reviewed the several reports issued by the bureau and, as examples of cooperative activity, referred particularly to the work of the pressure vessel committee involving a program of investigation amounting to $15,000 and the work of the welded rail joint committee amounting to some $80,000. The part of the research council in these investigations was reviewed.

At a meeting of the electric arc welding committee the chairman, W. L. Warner, General Electric Co., Schenectady, reported that the standards for arc welding apparatus had been revised by a sub-committee of the A. I. E. E. These revised standards had undergone further revision by a sub-committee under the chairmanship of H. M. Hobart, General Electric Co., and copies of the last draft were distributed to members of the committee for suggestions as to further revision.

A digest of the available information on the applications of arc welding to shipbuilding, prepared by E. W. Ewertz, Bethlehem Shipbuilding Co., Elizabeth, N. J., under the direction of the committee, is being published as a serial in *Marine Engineering*. The report includes a description of all the welded ships, a number of photographs, test results, cost data, discussion of design and other information.

A report embodying a digest of existing information on the welding of non-ferrous metals was presented by A. G. Bissell, Westinghouse Electric & Manufacturing Co., East Pittsburgh. The members of the committee will review the report and submit comments to the secretary.

Progress was reported by the sub-committee's dealing with the reviews of welding thin sheet metal and speed and cost of arc welding and also the preparation of specifications for specimens to secure data on the arc welding of steel for structural purposes. A training course for electric arc welders was completed at a meeting of the committee on training of operators.

At a joint meeting of the executive committee of the American Bureau of Welding and the board of directors of the society it was voted to appropriate $150 for shipment of some six tons of samples from the Electrical Testing Laboratories to Union College, where tests on them will be made. The series of tests, started during the war, is for determining certain fundamentals of arc welding. It was also decided to publish a directory of the society's membership.

An afternoon was given over to an inspection trip of the Homestead works of the Carnegie Steel Co. About 60 members made the trip and both the steel mill and welding shop were visited. A visit to the plants of the Westinghouse Electric & Mfg. Co., East Pittsburgh, was also made, the members being guests of the company at luncheon at the plant.

The fall dinner of the society was held at the Fort Pitt Hotel and the members of the society were guests at the annual meeting of the Pittsburgh Railway Club, held on the evening of Oct. 25. The meeting was concluded with a joint session with the Pittsburgh section of the society. At this session the attitude of insurance companies toward gas and electric welding was explained by Dr. A. D. Risteen, director of technical research, Travelers Insurance Co. A brief outline of the railroad situation was presented in an address by George D. Ogden, traffic manager Pennsylvania System, Pittsburgh.

A night school course in "Steel and Its Treatment" has been inaugurated in the Rock Island, Ill., high school under the auspices of the Tri-City Chapter of the American Society for Steel Treating. One hundred men from various shops of the tri-cities attended the first meeting of the course. C. H. Burgston, chairman of the Educational Extension Committee of the Tri-City Chapter, is in charge of the course. The first lecture was on the subject, "Manufacture of Steel," and was given by A. H. Putnam, consulting metallurgist, Davenport. The next lecture will be given by L. A. Marsh, inspection engineer, Inland Steel Co., Chicago, whose subject will be "Rolling Mill Practice."

The Iron Age and Its Readers

A FURTHER word on Dr. Ingalls' article, "Distribution of Wealth in the United States," which had first place in our issue of Oct. 4. The amount and character of the comment we have had confirms our own opinion that in presenting it THE IRON AGE did its readers a service much worth while.

In charging that 2 per cent of the people own 65 per cent of the wealth, radical propagandists convey the idea that in late years the wealth has been concentrating in fewer hands. The fact is that it is being more widely diffused.

The question is of such widespread interest and is going to be so much discussed in the coming 12 months that we have prepared a digest of Dr. Ingalls' remarkable article in leaflet form so that it may be generally distributed. Many readers of THE IRON AGE will have use for these reprints and as long as the supply holds out copies will be sent to those who ask for them.

British Iron and Steel Market

Japan Still Buying Heavy Tonnages of Sheets—Makers Quoting Into Next Summer—Prices of Many Products Stiffen

(By Cable)

LONDON, ENGLAND, Oct. 30.

Pig iron is strong on sustained home demand and restricted supply. The output has not yet been increased. Consumers, realizing that lower price levels are improbable, are covering their requirements for several months ahead.

Hematite is firmer on improved steel demand. Foreign ore is under better inquiry and some sales have been made to Wales. Sellers of Bilbao Rubio ask 22½s. ($5.04) c.i.f. Tees.

Increased business in finished steel is mainly in plates and structural material for the Continent. Makers are holding out for higher prices for forward shipments, owing to the uncertainty as to future prices of raw materials.

Continental markets are somewhat disorganized and few orders are being received by traders here. There are some Indian and Far Eastern inquiries.

In Germany the Ruhr plants are very disorganized—either shut down or working short time. French authorities now officially estimate the Ruhr iron and steel stocks to be reduced to 84,000 tons. Small quantities are now commencing to find their way into France, Belgium, Luxemburg and Holland.

Tin plate is firm. There is good business in all markets. South America is an active buyer, as also are domestic consumers. The works are well sold and prices are being "talked higher" for the near future.

Galvanized sheets are firm, with moderate sales to India, Australia and South America. The Far Eastern demand is quieter.

Black sheets are strong on continued Far Eastern demand. All thin sizes of Japan 6 x 3, 13's, 107 lb., are being sold for February shipment at £21 10s. (4.30c. per lb.) f.o.b. The works are quoting for June and July £21 5s. (4.25c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.48 per £1, as follows:

Durham coke, delivered	£1	19s.		to £2	0s.	$8.74	to	$8.96
Bilbao Rubio ore†	1	4				5.38		
Cleveland No. 1 foundry	5	7½				24.08		
Cleveland No. 3 foundry	5	0				22.40		
Cleveland No. 4 foundry	4	19				22.18		
Cleveland No. 4 forge	4	17½		to 4	18	21.84	to	21.95
Cleveland basic	4	12½		to 4	15	20.72	to	21.28
East Coast mixed	4	19½		to 5	0	22.29	to	22.40
East Coast hematite	4	19		to 5	0	22.18	to	22.40
Ferromanganese	17	0				76.16		
Ferromanganese*	17	0				76.16		
Rails, 60 lb. and up	8	0		to 9	0	35.84	to	40.32
Billets	7	10		to 8	5	33.60	to	36.96
Sheet and tin plate bars, Welsh	9	2½				40.88		
Tin plates, base box	1	3⅛		to 1	3¼	5.18	to	5.21
						C. per Lb.		
Ship plates	9	5		to 9	10	1.85	to	1.90
Boiler plates	12	10		to 13	0	2.50	to	2.60
Tees	9	15		to 10	0	1.95	to	2.00
Channels	9	0		to 9	5	1.80	to	1.85
Beams	8	15		to 9	0	1.75	to	1.80
Round bars, ¾ to 3 in.	10	5		to 10	15	2.05	to	2.15
Galvanized sheets, 24 g.	19	0		to 19	5	3.80	to	3.85
Black sheets, 24 gage	14	0				2.80		
Black sheets, Japanese specifications	15	5				3.05		
Steel hoops	12	0		& 12	10*	2.40	&	2.50*
Cold rolled steel strip, 20 gage	17	5				3.45		
Cotton ties, Indian specifications	15	0				3.00		

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Nominal)

Foundry pig iron:								
Belgium	£5	5s.		to £5	10s.	$23.52	to	$24.64
France	5	5		to 5	10	23.52	to	24.64
Luxemburg	5	5		to 5	10	23.52	to	24.64
Billets (nominal):								
Belgium	7	0				31.36		
France	7	0				31.36		
Merchant bars:						C. per Lb.		
Belgium	8	5				1.65		
Luxemburg	8	5				1.65		
France	8	5				1.65		
Joists (beams):								
Belgium	8	2½				1.63		
Luxemburg	8	2½				1.63		
France	8	2½				1.63		
Angles:								
Belgium	8	0		to 8	5	1.60	to	1.65
¼-in. plates:								
Belgium	8	10				1.70		
Germany	8	10				1.70		
⅜-in. plates:								
Luxemburg	7	15				1.55		
Belgium	8	0				1.60		

Pig Iron Too High—Government Orders for Structural Work—Shipbuilding Smallest in 14 Years

LONDON, ENGLAND, Oct. 18.—While it is true that, in certain cases, improved conditions have been noticeable during the past fortnight the general position remains much as it has been for the past few weeks. There has been a little more moving in pig iron, consumers showing more inclination to negotiate for forward supplies. It is clear that the price of pig iron is still too dear to permit of any inflow of orders. Of course makers blame costs, and these undoubtedly are the main stumbling block to selling prices coming down to an economic level. The selling price of No. 3 Cleveland is about 96s., while that of East Coast hematite is quoted at about 99s. and upwards.

In finished iron and steel, the appalling state of the shipbuilding industry is reflected in the poor demand for shipbuilding material and as this is really the backbone of the trade, conditions are far from promising. In this connection it is interesting to note that Sir Frederick Henderson, chairman of Messrs. D. & W. Henderson, shipbuilders on the Clyde, referring to the shipyards, states that the outlook had never been so black as it was at the present time, and it was unlikely that anything like the full capacity of the yards would be occupied for some years to come, only one-third of the berthage being occupied at the present time. The government has recently decided to spend large sums of money upon all kinds of structural work, such as bridge building and railroad track relaying to help to alleviate unemployment in the iron and steel trades, and doubtless this will go a long way toward doing so, but export buyers still refrain from purchasing on anything like the pre-war scale and confine their commitments to bare necessary requirements.

Lloyds Register of Shipping just published report the merchant tonnage under construction in Great Britain and Ireland at the end of September as 1,271,195 tons, which is about 67,000 tons less than at the end of the June quarter, and compared with a year ago represents a decrease of about 346,000 tons. The total includes 242,000 tons upon which work has been suspended for a long time or has been under abeyance owing to the boilermakers' dispute which has been affecting the yards. Deducting this amount in order to enable a comparison to be made with figures for normal times, the actual tonnage under construction at the end of September is 1,029,000 tons, the lowest figure recorded for over 14 years.

Upon a complicated structure of corporation financing, the General Motors Corporation will promote about 70 of its leading executives to the position of "special partners" in a profit-sharing relation. It is provided that the Managers' Securities Co. be formed with capital of $33,000,000. The parent company will subscribe for all class A and B stock, paying therefor $5,000,000 in cash, and will draw a contract with the new company, agreeing to pay to it from 1923 to 1930 5 per cent. of its net earnings above seven per cent. The new company will offer to purchase 2,250,000 shares of General Motors common stock at $15, payable $4,950,000 cash and $28,800,000 in its new seven per cent. preferred. President Alfred P. Sloan, Jr., stated that this plan of profit sharing was devised by directors as a means of retaining valuable men developed in managerial positions.

EXTRA DIVIDEND DECLARED

Chairman Gary Announces Action of Steel Corporation Committee

Slight Decrease in Earnings in September Attributed in Part to Abolishing Long Day—Orders Equal Half of Capacity

At a meeting of the finance committee of the United States Steel Corporation, Tuesday afternoon, it was decided to declare an additional dividend of ¼ per cent on the common stock. This announcement was made to representatives of the press by Chairman Gary at the conclusion of the meeting of the committee.

The report for the third quarter of 1923 was made public at the same time. It shows a surplus for the third time since the first quarter of 1921, when the surplus was $2,816,905, while the surplus for the second quarter of 1923 was $7,295,412, as compared with $4,859,351 for the first quarter. The surplus for the third quarter of 1923 was $6,349,235 before making the deduction of $1,270,756 for the extra dividend. The usual quarterly dividends of 1¾ per cent on the preferred and 1¼ per cent on the common stocks were included in the regular statement of earnings. The statement indicated that in the past quarter August was the best month and September was the poorest, but the earnings for the quarter were regarded as satisfactory. Earnings for the first three quarters of 1923 and the three preceding years were as follows:

Quarters	1923	1922	1921	1920
First.....	$34,780,069	$19,339,985	$32,286,722	$42,089,019
Second....	47,858,181	27,286,945	21,892,016	43,155,705
Third.....	47,053,680	27,468,339	18,918,058	48,051,540
Fourth...	.....	27,552,392	19,612,033	43,877,862
Net earnings each year		$101,647,671	$92,708,827	$177,174,126

The statement of the earnings for the third quarter ending Sept. 30 was as follows:

	Earnings Before Charging Interest on the Subsidiary Companies' Bonds Outstanding	Less: Interest on the Subsidiary Companies' Bonds Outstanding	Balance of Earnings
July, 1923.....	$16,454,777	$687,774	$15,767,003
August, 1923....	17,683,045	685,578	16,997,467
September, 1923.	14,974,695	685,485	14,289,210
	$49,112,517	$2,058,837	
Net earnings			$47,053,680
Less charges and allowances for depreciation and sinking funds on bonds of subsidiary companies			13,127,769
Net income			$33,925,911
Deduct: Interest for the quarter on U. S. Steel Corporation bonds outstanding		$4,660,476	
Premium on bonds redeemed.....		257,500	
			4,917,976
Balance			$29,007,935
Dividends on stocks of the United States Steel Corporation, viz.:			
Preferred, 1¾ per cent.....		$6,304,919	
Common, 1¼ per cent.....		6,353,781	
			12,658,700
			$16,349,235
Less sums appropriated and expended, or to be expended, account of additions, improvements or betterments to plants and properties			10,000,000
Surplus for the quarter.....			$6,349,235

Judge Gary's Statement

In response to questions as to the reason for declaring the dividend, Judge Gary merely smiled and said: "Well, I guess it was because we thought we could pay it." He added: "I assure you this matter of the extra dividend was not considered until 3 o'clock this afternoon and only one member of the finance committee knew that the matter was to be considered. You may guess who that one man was. We directors do not take advantage of any advance information. That is really saying something, for the time was when it was considered by many business men proper to avail themselves of information about contemplated action in order to make money in the stock market."

Judge Gary said that probably the abolishing of the 12-hr. day was responsible to some extent to the reduction of earnings in September, but there were other elements, and no definite information is now obtainable as to the exact effect of the change from the 12-hr. day. He added that such information would not be actually determined for six months and possibly not for a year.

"Our earnings are fairly good," said Judge Gary, "but I would be less than frank if I should say that new business is heavy enough to insure keeping all our works fully in operation. It is natural for orders to fall off in midsummer and even in early fall. Our bookings now are about one-half of our production capacity, but inquiries, which include requests for prices and ask information as to when shipments can be made, are very large. Apparently a good deal of business is in prospect and many of these inquiries may result in orders. The necessities of the public are large and ability to pay is sufficient. As to how much business will develop, no one can tell, but we are confident as to the future."

Dropping into lighter vein, as the judge chatted with the newspaper men, he was asked whether it was true as reported by a writer in a New York paper that his ambition when he was ten years old was to be a labor agitator and strike leader. Judge Gary laughed and said: "When I was ten years old my ambition was to get my lessons so as not to be criticized by the school teacher and I was also fond of going swimming when my duties on the farm permitted. My ambitions were much like those of other boys of ten."

Cold-Rolled Strip Steel Makers Hold Meeting in New York

How to increase the consumption of cold-rolled strip steel was one of the subjects of discussion at a meeting of 35 companies making cold-rolled strip steel held in the Waldorf-Astoria hotel in New York, Wednesday, Oct. 24, representing about 98 per cent of the country's production. E. W. Harrison, Philadelphia, was chairman, and Chas. M. Best, Pittsburgh, was secretary. It developed that many new uses for cold-rolled strip steel are being found. A suggestion that meetings of the cold-rolled strip makers be held quarterly in the future was adopted, and as most of the makers are members of the American Iron and Steel Institute and attend its meetings, it was decided that two of the quarterly meetings would be just prior to or following the semi-annual meetings of the institute. Each manufacturer pledged for his own company his entire cooperation in the devising of ways and means for the disposal of the surplus production, which for some time has been heavy.

Increased costs of manufacture, due to the adoption of the 8-hr. day were also discussed. A canvass of the manufacturers present developed that export business in cold-rolled strip steel is less than 1 per cent of production.

Puddlers' Wages Reduced

YOUNGSTOWN, Oct. 30.—The average price of bar iron shipped by Midwestern mills during the 60-day period ending Oct. 20 was 2.40c. per lb. as compared with the 2.50c. average two months ago. This decline of 10c. per 100 lb. will result in a reduction in puddling rate for November-December to $13.38 per ton as compared with $13.88 paid in September-October. This is the first decline in the puddling rate in a number of bi-monthly periods.

The examination of sales sheets to determine the rate was conducted Oct. 29 at Youngstown between James H. Nutt, secretary of the Western Bar Iron Association and M. F. Tighe, of Pittsburgh, president of the Amalgamated Association of Iron, Steel and Tin Workers.

Iron and Steel Markets

BUYING REDUCED

Late October at 50 Per Cent Basis

Pig Iron Again Lower But Steel Prices Remain Firm

Buying of steel in the last week of October was probably little more than 50 per cent of capacity, and brought the month's total not much above that of September. Indications are that the leading interest and the independents are experiencing about the same reduction in orders. The diminishing backlogs are causing some curtailment of operations here and there.

It is still a question how long replenishment needs can be kept restrained. The consumer's effort to secure price revision is resulting in a temporary freezing of bookings through a refusal to specify against contracts.

The producer still sees no object in reductions, and looks for November to continue the performances of the past two months. Expectations of betterment lie in a swelling of railroad demands, the continued activity of automobile manufacture, the large scale of building construction and the effect of growing Japanese purchases.

The Steel Corporation's statement of earnings gives little, if any, indication of the effects of the increased cost up to Oct. 1 due to the abolishing of the 12-hour day.

Japanese buying is steadily materializing. In Chicago 2000 tons of black sheets were closed for December delivery and a Washington dispatch reports calls for bids on 13,000 tons of black sheets, 7000 tons of galvanized sheets and 3000 tons of nails. The Steel Corporation's bookings appear to total 20,000 tons of sheets.

Railroad developments include an inquiry of upward of 27,000 tons of rails for the Nickel Plate and the purchase by the Chesapeake & Ohio of 17,000 tons of tie plates, divided between the Wheeling and Bethlehem steel corporations, and 2500 tons for the Union Pacific placed in Chicago. The Louisville & Nashville has bought 15,000 kegs of spikes.

In equipment, besides the 43 locomotives for the Southern Pacific, the Lackawanna has bought 25 locomotives. The Baltimore & Ohio is about to buy 1547 cars and the Great Northern has inquired for 500 stock cars.

Of 17,500 tons of fabricated steel bookings, 6000 tons was for railroad work, including a Baltimore & Ohio dock. Last week awards totaled 11,000 tons. Fresh inquiries at 5000 tons were the smallest in a number of weeks.

Prices of pig iron are fairly well maintained on small tonnages for prompt delivery, but considerably lower quotations have developed on a few large size sales. In the active competition of eastern Pennsylvania and New Jersey furnaces, concessions of $1 to $2 per ton have been made and one sale of 2200 tons was at $21, furnace, while a cast iron pipe manufacturer purchased 5000 to 7500 tons at $22.50, delivered. The reductions at Chicago, Pittsburgh and other centers range from 50c. to $1, and in southern Ohio silvery irons have been reduced $2. Charcoal iron has been marked down $1.

Decrease in the average selling price of bar iron in the Central West for the past two months will cause a reduction of 50c. per ton from wages of puddlers, this being the first reduction in a long period.

The booking of tin plate orders for 1924 is expected next week. Present commitments are keeping the mills up to an 85 to 90 per cent basis.

Farm implement manufacturers are operating at not over 40 to 50 per cent of capacity, but own to hopeful view of the immediate future. A fair amount of exporting is being done to South America and France.

The spotty condition of buying is indicated in bolts and nuts. One seller's bookings in October were 25 per cent heavier than in September. Current demand is far from satisfactory and prices still are soft.

Cold finished bars are easier and sales have been made at the 3c. basis.

British prices of pig iron and steel have stiffened all along the line. Black sheets, due to Far Eastern demand, are being quoted for June and July delivery.

THE IRON AGE pig iron composite price has fallen to $22.27 from $22.96 last week, the lowest figure since the $22.23 of May 2, 1922, and $8.59 below the high price of last April.

For 28 successive weeks, save for a 28c. a ton drop 15 weeks ago, THE IRON AGE finished steel composite price has remained unchanged. It is 2.775c. per lb., and compares with 2.446c. per lb. one year ago and with 3.724c. per lb. three years ago.

Pittsburgh

More Cheerful Feeling Prevails, But Improvement Is Not Pronounced

PITTSBURGH, Oct. 30.—Based partly on larger tonnages placed with mills in the Pittsburgh district during the past week, but more largely on prospective business which is assuming tangible form, a more cheerful tone has developed in the iron and steel trade here. Some lines, however, continue to reflect price recessions. This is especially true of gray forge, foundry basic and malleable pig iron, which have declined 50c. a ton. Cold-finished steel bars also are somewhat easier and new business has been taken at 3c.

Some producers of sheets are quoting from $2 to $3 under the market, but without apparent effect upon other mills, which are taking tonnages at so-called regular prices. The Japanese Government has placed an order for a fairly heavy tonnage of black and galvanized sheets with the American Sheet & Tin Plate Co.

Operations of sheet mills range from 80 to 86 per cent of capacity, makers have a fairly large rolling schedule ahead of them, and it has been increased by fair sized tonnages placed by the automotive industry. Operations of tin plate mills range from 85 to 91 per cent of capacity, and most mills are committed for the remainder of the year with prospects for good business in the new year, for which books probably will be

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Oct. 30, 1923	Oct. 23, 1923	Oct. 2, 1923	Oct. 31, 1922
No. 2X, Philadelphia‡	*$22.64*	$23.76	$24.76	$31.14
No. 2, Valley furnace†	*22.50*	23.00	24.50	30.00
No. 2, Southern, Cin'ti†	*23.55*	24.05	25.05	29.05
No. 2, Birmingham, Ala.†	*19.50*	20.00	21.00	25.00
No. 2 foundry, Chicago*	*24.00*	25.00	26.00	31.00
Basic, del'd, eastern Pa.	*23.00*	24.50	25.00	28.50
Basic, Valley furnace	*22.50*	23.00	24.00	30.00
Valley Bessemer, del P'gh.	26.76	26.76	27.26	34.77
Malleable, Chicago*	*24.00*	25.00	26.00	31.00
Malleable, Valley	*22.00*	22.50	24.50	32.00
Gray forge, Pittsburgh	*24.26*	24.76	25.75	31.27
L. S. charcoal, Chicago	*29.15*	30.04	30.04	36.15
Ferromanganese, furnace	110.00	110.00	110.00	100.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	40.00
O.-h. billets, Pittsburgh	40.00	40.00	40.00	40.00
O.-h. sheet bars, P'gh.	42.50	42.50	42.50	39.00
Forging billets, base, P'gh.	47.50	47.50	47.50	45.00
O.-h. billets, Phila.	45.17	45.17	45.17	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh. lb	2.40	2.40	2.40	2.00
Light rails at mill	2.25	2.25	2.15	2.00

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.325
Iron bars, Chicago	2.40	2.40	2.35	2.50
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.00
Tank plates, Chicago	2.60	2.60	2.60	2.30
Tank plates, New York	2.74	2.74	2.84	2.34
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.60	2.20
Beams, New York	2.74	2.74	2.84	2.34
Steel hoops, Pittsburgh	3.15	3.15	3.00	2.90

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25 ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Oct. 30, 1923 Cents	Oct. 23, 1923 Cents	Oct. 2, 1923 Cents	Oct. 31, 1922 Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.50
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.60
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$17.50	$17.50	$19.00	$25.50
Carwheels, Philadelphia	19.00	19.00	20.50	21.00
Heavy steel scrap, P'gh.	15.00	15.00	16.50	21.00
Heavy steel scrap, Phila.	15.00	15.00	16.00	17.00
Heavy steel scrap, Ch'go	*13.50*	13.75	15.00	18.00
No. 1 cast, Pittsburgh	18.50	18.50	21.00	24.00
No. 1 cast, Philadelphia	19.00	19.00	20.50	22.00
No. 1 cast, Ch'go (net ton)	*18.00*	18.50	19.00	20.50
No. 1 RR. wrot. Phila.	17.00	17.00	19.00	21.00
No. 1 RR. wrot. Ch'go (net)	*12.00*	12.50	14.50	17.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$4.00	$7.50
Foundry coke, prompt	4.75	4.75	5.00	10.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	*13.00*	13.12½	13.75	14.12½
Electrolytic copper, refinery	*12.25*	12.50	13.00	13.62½
Zinc, St. Louis	6.32½	6.32½	6.30	7.10
Zinc, New York	6.67½	6.67½	6.65	7.45
Lead, St. Louis	*6.45*	6.55	6.70	6.50
Lead, New York	*6.75*	6.85	7.00	6.80
Tin (Straits), New York	**41.50**	41.25	41.87½	37.00
Antimony (Asiatic), N. Y.	**8.50**	8.00	7.50	6.70

The prices in the above table are for domestic delivery and do not necessarily apply to export business

Composite Price Oct. 30, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Oct. 23, 1923,	2.775c.
Oct. 2, 1923,	2.775c.
Oct. 31, 1922,	2.446c.
10-year pre-war average,	1.689c.

Composite Price Oct. 30, 1923, Pig Iron, $22.27 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Oct. 23, 1923,	$22.96
Oct. 2, 1923,	23.96
Oct. 31, 1922,	29.52
10-year pre-war average,	15.72

open next week. Rail mills also are fully engaged, and the present programs of carriers call for requirements that will assure capacity operations over the first half of 1924.

Inquiries for structural steel running as high as 3000 tons are expected to develop into orders in the near future. Pipe mills are operating at a high rate on standard line sizes up to 3 in. and there are indications of better business in lapweld sizes for the oil country. Wire mills continue to operate at a good capacity. The Carnegie Steel Steel Co. is operating at about 90 per cent of ingot capacity and has 43 of its 59 blast furnaces in operation, while the Jones & Laughlin Steel Corporation has 10 of its 12 furnaces in blast. The tone of the coke market is stronger but prices are not changed. Further declines have been made in prices of old material.

Pig Iron.—Further weakness in foundry iron is reflected by price recessions of 50c. a ton. The Standard Sanitary Mfg. Co. has closed for 3000 tons of No. 2 foundry and No. 2X iron, which, figured on a Valley basis, went at an average price of a little less than $22.50. The iron was purchased from several sources, some of it coming from a Valley furnace at a price said to have been $22.50, at which the market on No. 2 foundry now is quoted. The No. 3 foundry market is $22, Valley. A sale of 500 tons of gray forge by a Valley furnace to a Pittsburgh consumer has been made at $22.50. Malleable iron is quoted at $22, Valley, although it is reported that this grade is being offered at as low as $21.50. There has not been sufficient activity in the market for steel-making grades during the past week to test it. Meanwhile basic is quoted at $22.50, Valley, and Bessemer at $25, Valley. A Valley furnace has sold a small lot of Bessemer iron at $24, Valley, but it is said that this furnace has no sizeable tonnage of this grade of iron, and other makers, who are producing Bessemer, have asked and received $25 for the small tonnages they have sold. The Struthers Furnace Co. will put in blast its furnace at Struthers,

Ohio, the latter part of the present week to make No. 2 foundry.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$22.50
Bessemer	25.00
Gray forge	22.50
No. 2 foundry	22.50
No. 3 foundry	22.00
Malleable	22.00
Low phosphorus, copper free	30.00

Ferroalloys.—The market for standard ferromanganese still is quoted at $110, Atlantic seaboard, by producers but has been disturbed somewhat by a resale transaction by a middle interest of three lots aggregating 800 tons at $108, most of the tonnage being for delivery in the Pittsburgh district. It is reported that this tonnage came from a producer, and was originally intended to apply on contract, but was not specified against. Apparently there are not any further immediate tonnages available at this quotation. Consumers are buying in small lots only, and indications of stimulated demand for the early future are not promising. The market for 19 to 21 per cent spiegeleisen also is quiet and shows a softer tone. While small lots are reported to have moved at $42 during the past week, some makers still quote as high as $45, furnace. Quotations on silvery grades have been reduced $2 by Jackson County makers. Prices are given on page 1213.

Sheets.—Large orders for black and galvanized sheets have been placed with the American Sheet & Tin Plate Co. by the Japanese Government for use in reconstruction of the area destroyed by the recent earthquake and fire. It is noted with interest that these orders call for heavier gages than are usually purchased by Japan. This Steel Corporation subsidiary is heavily engaged and is operating at 86 per cent of capacity on sheets. Operations of independent sheet mills generally in this district are estimated at approximately 80 per cent of capacity. Domestic business is fair and demand calls for the various grades of sheets. Inquiries and orders from the automotive trade are unusually good for this season of the year. As a whole, however, the market is not strong and it is reported that some producers are making concessions of $2 to $3 per ton, but these easier prices apparently have not affected the market perceptibly. Galvanized sheets, No. 28, continue to be quoted at 5c., No. 28 black at 3.85c., and blue annealed, No. 10, at 3c. Prices are given on page 1212. Tin plate operations of tin plate mills in this district reflect comfortable bookings. The American Sheet & Tin Plate Co. operated at 91 per cent of capacity last week and was engaged more heavily than any other week since the early part of the present year. Independent operations are almost as great. The American Sheet & Tin Plate Co. has a rolling schedule which will call for all it can do over the remainder of the year. Prospects for tin plate business next year are bright. It is expected that books for the first quarter and first half of 1924 will be opened next week.

Semi-Finished Steel.—Demand for semi-finished steel is small, and no sizable sales providing a real test of the market during the past week have been reported. Specifications against contracts show only moderate improvement. A range of $40 to $42.50, Pittsburgh, still is maintained on rolling billets for both 2-in. and under and 2-in. and over, with indications that an attractive inquiry would develop the lower figure from some producers. The quotation of $47.50, Pittsburgh, still is quoted on forging billets of ordinary carbon steel, while the light demand for sheet bars brings the quotation of $42.50, Pittsburgh, for both the Bessemer and open-hearth grades. Small lots of wire rods are being placed with producers at $51, base. Business in this line is quiet and quick shipment is being made. The Carnegie Steel Co. is operating at 89 per cent of ingot capacity, while generally operations of independent companies continue to range between 70 and 75 per cent.

Plates.—Makers of plates report a slight improvement in demand during the past week and comes from miscellaneous consuming sources, particularly the railroads. Purchases and specifications, however, involve comparatively small lots and evidently are being made to meet immediate requirements. Producers in this district still are quoting 2.50c., base, Pittsburgh. Deliveries are being made in two weeks to 30 days, depending on the size of the orders and the gage of the steel. The chief demand is for plates ¼-in. and heavier. Operations of plate mills, generally in this district, range from 75 to 80 per cent, and are made possible largely because of backlog business. Prices given on page 1212.

Structural Steel.—While the demand for structural steel continues to be light, several jobs involving lots of 700 to 800 up to 2000 to 3000 tons are before fabricators. Most of the tonnage is for industrial construction. The railroads also placed a little more business during the past week than they did during the preceding week. Early delivery is being made and mills in this district are holding to the quotation of 2.50c., base, Pittsburgh. Operations of structural mills range between 70 and 80 per cent of capacity. The McClintic-Marshall Co. has taken approximately 450 tons for buildings at Tiffin, Ohio, for the Standard Sanitary Mfg. Co. Prices are given on page 1212.

Iron and Steel Bars.—Small orders to meet immediate needs are being placed for steel bars, but the market remains dull. Although lower quotations are said to be quoted by mills in some districts, those in the Pittsburgh district are maintaining the price of 2.40c., base, Pittsburgh. They report fair bookings on old business and operations are estimated at 65 to 70 per cent of capacity. The market for iron bars remains limited with no change in prices.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Hot-Rolled Flats.—A small demand exists for hoops and bands, with makers quoting 3.15c., base. A somewhat better demand is being made for hot-rolled strip steel, quoted at 3c. to 3.15c., and it is reported that the lower figure is being offered more generally than it has been. Operations range from 60 to 65 per cent of capacity, and deliveries are being made in from two to three weeks.

Wire Products.—Orders placed this month with mills in this district for wire products exceed those of September. Specifications against contracts also have been heavier than they were last month. While new business is fairly good, some mills report that it is slightly less than production. Demand is well distributed and covers such leading lines as bright wire, galvanized wire, wire fencing and nails. The greatest demand is for mixed carloads and the jobbing trade reports good business. Some producers are booked for the remainder of the year, while others have a 30-day backlog. The demand for nails is most marked in construction lines. The merchant trade is taking fair sized tonnages of various lines, including wire fencing. While the demand for galvanized wire is fair, this is also true of bright wire for some mills, although some producers report that inquiry for the latter product is a little below the average. Quotations are unchanged. Prices are given on page 1212.

Tubular Goods.—Orders for merchant buttweld steel pipe involve good sized tonnages, calling for black and galvanized sizes up to 3-in. There are large tonnages of unfilled orders which are more than necessary to carry the mills through the remainder of the year. Buyers are bringing pressure for early deliveries. Fair demand is reported for lapweld sizes in merchant steel pipe and it comes from miscellaneous sources. Conditions in the oil fields have resulted in curtailment of incoming business, but the mills have orders on their books on which they are operating and this business will carry most of them either through or almost to the end of the year. Prices are firm in all lines, and no evidence has appeared of concessions being made. Some producers report that the oil country situation gives promise of renewed activity shortly after the new year and think that there will be steady and satisfactory de-

mand for all classes. Inquiries are out for heavy tonnages of line steel pipe and it is claimed the business will be placed soon and will have a stimulating effect. Fair demand also is being made for buttweld sizes of iron pipe, while that for lapweld iron pipe is only moderate. Prices are given on page 1212.

Cold-Rolled Strips.—Demand for cold-rolled strip steel is fair and comes chiefly from the automotive industry, although other consumers have placed small orders during the past week. Makers report that the price of 5c., base, is well established. Deliveries are being made in two to three weeks and operations range from 60 to 65 per cent capacity.

Cold-Finished Steel Bars and Shafting.—The market for cold-finished steel bars has softened and business is now being taken at 3c. by some large makers as well as smaller producers, although the price of 3.25c. apparently has not entirely disappeared. The automotive industry has placed a moderate amount of business, which is said to have been done at 3c. Mills are making prompt deliveries. Ground shafting is steady and unchanged at 3.65c. base f.o.b. mill.

Rails.—Makers of standard steel rails are heavily committed over the remainder of the year, and the carriers are placing orders for large tonnages. Plans they have already made are said to assure capacity operations over the first half of 1924. The rail mills, therefore, are faced with the problem of meeting demands and making deliveries as will be required by the carriers whose program calls for laying of a great amount of trackage. Some of the tonnages being placed involve extraordinarily heavy requirements. Demand for light rails is dull, but producers rolling from new steel say that the price of 2.25c., base, covering rails up to 45-lb., is well established. Rerolled rails still are quoted at 1.85c. to 2c., base. Orders for light rails generally involve car lots.

We quote light rails rolled from new steel at 2.25c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Bolts, Nuts and Rivets.—The market for bolts, nuts and rivets continues to be soft and some makers in order to attract business are making concessions ranging from 2½ to 5 per cent of the list prices. Others maintain the regularly quoted prices. The railroads are buying small lots of bolts and nuts. Prompt shipments are being made. Operations vary from 45 per cent to full capacity. Prices are given on page 1212.

Track Supplies.—Greater demand is being made for standard spikes. The railroads have shown renewed activity. The Louisville & Nashville Railroad has placed an order in this district for 15,000 kegs. Prices remain unchanged at $3.15 per 100-lb., base. The better demand generally does not call for large orders, but principally involves small lots. Deliveries are being made early, and some producers, who are shipping on back orders, expect to catch up in November or December and report that requirements for 1924 so far are only slight. The market for small spikes is quiet, and will not be stimulated until operations of coal mines increase. The prices for small spikes remain unchanged at $3.50.

Coke and Coal.—Curtailment of additional capacity has given a firmer tone to the market for both furnace and foundry coke. While neither demand nor consumption is any greater, production and consumption are more nearly equalized. The market for 48-hr. fuel is quoted at $3.75 to $4, Connellsville ovens, with some producers insisting on the higher price for standard quality coke. At the same time, scattering lots have been sold at $3.50. Demand for foundry coke is stronger than for the furnace grade, and while the market is quoted at $4.75, Connellsville ovens, sales of the best quality fuel have been made at higher figures. The market for coal is sagging, the coking grade being available at the wide range of $2 to $2.75, depending largely on quality and the urgency of the demand. There are reports of sales of less desirable tonnage at as low as $1.85. The best grade of gas coal commands from $2 to $2.50, mine run, while steam coal is quoted at $1.25 to $1.50.

Scrap.—The market for old material is extremely dull, and some leading grades have shown a further decline, amounting to 50c. a ton. Consumers are showing practically no interest in the market. Heavy melting steel is quoted at $15 to $15.50 a ton, and it is said the cost of production barely is covered at this range. A nearby West Virginia steel mill is said to have bought a fair sized tonnage of this old material, involving rigid specifications at $16, but this is considered to be above the regular market.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton	
Heavy melting steel	$15.00 to	$15.50
No. 1 cast, cupola size	18.50 to	19.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa	17.50 to	18.00
Compressed sheet steel	14.00 to	14.50
Bundled sheets, sides and ends	12.50 to	13.00
Railroad knuckles and couplers	17.50 to	18.00
Railroad coil and leaf springs	17.50 to	18.00
Low phosphorus bloom and billet ends	20.50 to	21.00
Low phosphorus plate and other material	18.50 to	19.00
Railroad malleable	18.00 to	18.50
Steel car axles	18.50 to	19.00
Cast iron wheels	17.50 to	18.00
Rolled steel wheels	17.50 to	18.00
Machine shop turnings	10.50 to	11.00
Sheet bar crops	16.00 to	16.50
Heavy steel axle turnings	13.00 to	13.50
Short shoveling turnings	12.00 to	12.50
Heavy breakable cast	14.00 to	14.50
Stove plate	13.50 to	14.00
Cast iron borings	12.00 to	12.50
No. 1 railroad wrought	13.00 to	13.50
No. 2 railroad wrought	15.00 to	15.50

Recently Acquired Zanesville Plants of the Youngstown Sheet & Tube Co.

The recently acquired Zanesville plants of the Youngstown Sheet & Tube Co., Youngstown, Ohio, secured through purchase of the Steel & Tube company of America, consist of modern tube mills and a plant devoted to the manufacture of special machinery.

The tube mill plant site contains 43 acres, and the buildings have an area of about 300,000 sq. ft. under roof, together with large yards equipped with overhead cranes and modern facilities for carrying on operations. The property has rail connections with the Baltimore & Ohio, Wheeling & Lake Erie, New York Central and Pennsylvania lines.

The plant manufactures its own electric power and gas, the necessary coal being supplied by the mines of the Redfield Coal Co., located about 14 miles away, and also owned by the Sheet & Tube company. Present capacity of the property is about 20,000 tons of pipe per month, ranging in size from ⅛-in. to 15-in. in diameter. The main building at the works, 160 x 1000 ft., houses two lapweld pipe mills at one end and two buttweld mills at the other, drawing their skelp from storage in the center. Skelp for these mills is now being supplied from the plate mills at Youngstown in the Brier Hill division of the Sheet & Tube company.

There are also two coupling shops, one furnace or welding building, the other finishing or tapping building. The plant also includes the necessary auxiliary departments.

The plant was originally started and operated by the Eastern Tube Co., and turned out its first pipe on Sept. 11, 1901. In 1904, the Mark Mfg. Co., Chicago, acquired the property and assumed control. Many improvements were made under this company's management and ownership, which retained control until the formation of the Steel & Tube company.

Since July 1, 1923, the property has been managed by the Sheet & Tube company, under direction of E. T. McCleary, located at Youngstown, with the title of district manager of the Eastern division.

Chicago

Pig Iron Prices Decline—Railroad Orders Develop Very Slowly

CHICAGO, Oct. 30.—Further declines in scrap and pig iron and continued stagnation in finished steel constitute the main features of the market situation for the week. Although one important mill booked twice the tonnage in the past seven days that it took in the previous week, buying continues to be confined to immediate needs, indicating that consumers have not abandoned their policy of watchful waiting. The approach of the inventory-taking period has still further increased the caution of buyers and many of them are limiting their purchases to small lots from warehouse to keep their stock down to a minimum figure at the turn of the year. In fact, jobbers' sales in October were larger than expected, in some instances exceeding those for September by fully 10 per cent.

Shipments from mills still run heavier than new bookings and in view of the steady contraction of mill backlogs, buyers feel that prices may soon reflect the anxiety of producers for new tonnage. Except for more frequent concessions in sheets, finished steel prices are still firm, however. It is no secret that one of the most potent reasons that producers are holding so tenaciously to present price levels is the belief that lower prices, instead of bringing out business, would merely intensify uncertainty as to the future course of the market.

Prospective railroad car buying, upon which producers have been placing much dependence in gaging steel demand for the coming months, is exceedingly slow in materializing. Perhaps the most encouraging development of the week was the fact that the Southern Pacific, which has been counted upon to buy 18,000 cars, has actually placed orders for 43 locomotives.

Local mill operations show no material change. The Illinois Steel Co. has again turned on the blast on two Joliet stacks that were recently banked and now has a total of 23 out of 27 steel works blast furnaces active. Its steel output is at the rate of 93 per cent of ingot capacity. The Inland Steel Co. is on a 70 to 75 per cent basis.

Pig Iron.—Prices have again given ground in the absence of active demand. With outside producers offering their products from the North, the East and the South, competition is keen and prices show considerable variance. At Chicago $24 base, furnace, appears to be the ruling market on Northern iron, but at outlying points, notably in Michigan and down-State Illinois delivered prices have in some instances figured back to less than that figure, deducting the freight from Chicago. Southern iron for delivery by water and rail is now quoted at $24.75, delivered Chicago. Southern foundry for all rail shipment is freely offered at $19.50 base, Birmingham, and as low as $19 has been done. A report that $18, Birmingham, has been quoted lacks verification. Current orders are small, ranging from carloads to 500 tons, and represent the immediate needs of melters. With inventory taking approaching, users have a further incentive to hold their purchases down. Several hundred tons of charcoal have been sold in Michigan at $26 base, furnace, a concession of $1 a ton. Silvery prices have declined $2 per ton.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$29.15 to $30.15
Northern coke, No. 1, sil. 2.25 to 2.75	24.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	24.00
Malleable, not over 2.25 sil.	24.00
Basic	24.00
High phosphorus	24.00
Southern No. 2	24.75 to 25.51
Low phos., sil. 1 to 2 per cent, copper free	33.25 to 34.00
Silvery, sil. 8 per cent	37.29

Ferroalloys.—British producers have reduced their prices on ferromanganese to $110, seaboard, and while it is said that material can be bought for less, no sales are reported. There continue to be sales of spiegeleisen at the figures published below, but with the exhaustion of the supplies of a producer whose furnace is now down, prices are expected to stiffen.

We quote 80 per cent ferromanganese, $117.56, delivered; 50 per cent ferrosilicon, $85 to $87, delivered; spiegeleisen, 18 to 22 per cent, $43.80 to $44.30, delivered.

Plates.—Expected purchases of railroad cars have not yet materialized and no new orders for oil storage tanks are reported. New business in plates is light, but such orders as are being placed generally call for quick delivery, indicating that user's stocks are low. Prices are still unchanged.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Cast Iron Pipe.—Denver has awarded 2800 tons of large sizes to the United States Cast Iron Pipe & Foundry Co. and 1200 tons in smaller diameters to the Colorado Fuel & Iron Co. Joliet, Ill., takes bids on 200 tons of 6-, 8- and 10-in. today. Duluth receives tenders today in 100 tons. The American Cast Iron Pipe Co. was low bidder on 570 tons of 8-in. water pipe for Chicago with a price of $46, base Birmingham. This bid, however, was for extended delivery. On November shipment, $48, Birmingham, appears to be the best going quotation. Prices on Delavaud centrifugal pipe, which will probably be announced soon, will be higher than on sand-cast per ton, but lower per foot.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $60.20; 6-in. and above, $56.20; class A and gas pipe, $5 extra.

Sheets.—A local mill has taken further orders for Japanese delivery involving 2000 tons of black sheets. These are for shipment in December. Domestic purchases of sheets are confined to small lots to cover consumers' immediate needs. Prices are softer, particularly on black and galvanized. As low as 3.70c., base, Pittsburgh, has been done on the former and 4.90c. on the latter. Price concessions are still exceptional, however, and the larger mills are adhering already to their old quotations.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4c. for blue annealed, 4.70c. for black and 5.85c. for galvanized.

Bolts and Nuts.—One important seller reports October bookings 25 per cent heavier than those for September. Current demand, however, is still far from satisfactory and prices are soft. On machine bolts with cut threads 60 and 10 and 5 off is being done and on carriage bolts with cut threads 60 and 5 off is not an uncommon quotation.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.20c.; machine bolts up to ⅞ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Rails and Track Supplies.—The Nickel Plate is inquiring for 15,000 tons of standard section rails. The distribution of the Pennsylvania order for 200,000 tons is expected momentarily. The Union Pacific has placed 2500 tons of tie plates with a Chicago mill. The Chesapeake & Ohio recently closed for 17,000 tons of tie plates in the East, having divided the order between the Wheeling Steel Corporation and the Bethlehem Steel Co. Demand for light rails is slack and mills occasionally find it necessary to shade their price of 2.25c. to interest prospective buyers.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c. f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.75c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base, and track bolts, 4.90c. base.

Structural Material.—Fabricators are steadily reducing their obligations and while some of them still have three to four months' work ahead of them, others are showing their anxiety for new business through lower quotations on current inquiries. Lettings during the week were fairly numerous, although involving small tonnages. The East Lake Street substation of the Commonwealth Edison Co., Chicago, will require 1500 tons instead of 1000 tons, as previously announced. A viaduct in the Union Stock Yards, Omaha, will take 1200 tons. Buying of plain material is still on a hand-to-mouth basis and current mill bookings continue to fall short of shipments. Prices, however, remain unchanged.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Wire Products.—New buying is limited and purchases for stocking purposes are not expected in view of the early deliveries now available from the mills. The fact that inventory taking is steadily drawing near also tends to discourage forward buying at this time. Present mill bookings cover four or five weeks' work ahead. Prices, which remain unchanged, are shown on page 1212.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Bars.—Orders for soft steel bars show a slight gain, but buyers continue to confine their purchases to their immediate needs. Users' stocks are low, but in most instances their consumption is well maintained. The operations of automobile manufacturers still exceed those of any previous year. Farm implement makers are not running at over 40 to 50 per cent of capacity, but they are taking a more hopeful view of the future. While they are booking little business in the wheat-growing sections, they find prospects improved in other parts of the country and are doing a fair amount of export business, principally for shipment to South America and France. Local prices on soft steel bars remain firm at 2.50c. Demand for bar iron and rail steel bars shows little, if any, improvement, but mills are holding firmly to prices.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. base; hoops, 4.55c.; bands, 3.95c.

Warehouse Prices.—Local jobbers have reduced blue annealed sheets $7 a ton and black and galvanized $10 a ton. These reductions reflect highly competitive conditions among warehouses rather than any important change in mill prices. The new quotations are shown under the paragraph on sheets.

Reinforcing Bars.—Inquiries and lettings of reinforcing bars are few, and while the ruling price remains 2.75c., warehouse, it is possible that better than this could be done on an attractive tonnage. The R. F. Conway Co., Chicago, has a general contract for the McCormick Road to be built by the Sanitary District, Chicago. Approximately 700 tons of reinforcing bars are involved, and these will probably be bought for shipment from mill instead of from warehouse. Lettings include:

Monarch Portland Cement Co. plant, Humboldt, Kan., 200 tons to Kansas City Bolt & Nut Co.

Superstructure for Capitol Theater building, Seventy-ninth and Halsted Streets, Chicago, 175 tons to Concrete Engineering Co.

School building, Council Bluffs, Iowa, 100 tons to Concrete Steel Co.

Pending business includes:

County paving work, Waterloo, Iowa, 400 tons.

Old Material.—With consumer buying light and railroad offerings exceptionally heavy, prices continue to decline. Railroad lists this week are unusually large and the chief interest of the trade at the moment is how much further prices will be depressed through the absorption of so large a quantity of material at this time. The Illinois Central offers 11,000 tons; the Pennsylvania Southwestern Region, 7200 tons; Pennsylvania, Northwestern Region, 3000 tons; Pennsylvania, Central Region, 14,000 tons; Pennsylvania, Eastern Region, 31,000 tons; the Burlington, 7600 tons; the Santa Fé, 3000 tons; the Northwestern, 4000 tons; the Great Northern, 1900 tons; the St. Paul, 1000 tons; the Alton, 700 tons; George W. Jennings, 1600 tons; and the Erie, the Michigan Central and the New York Central blind lists.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$19.50 to	$20.00
Cast iron car wheels	17.50 to	18.00
Relaying rails, 56 and 60 lb.	26.00 to	27.00
Relaying rails, 65 lb. and heavier	32.00 to	35.00
Rolled or forged steel car wheels	17.00 to	17.50
Rails for rolling	14.50 to	16.00
Steel rails, less than 3 ft.	16.00 to	16.50
Heavy melting steel	13.50 to	14.00
Frogs, switches and guards cut apart	13.50 to	14.00
Shoveling steel	13.25 to	13.75
Drop forge flashings	9.00 to	9.50
Hydraulic compressed sheets	11.00 to	11.50
Axle turnings	10.50 to	11.00
Steel angle bars	15.00 to	15.50
	Per Net Ton	
Iron angle and splice bars	17.50 to	18.00
Iron arch bars and transoms	17.50 to	18.00
Iron car axles	23.50 to	24.00
Steel car axles	15.00 to	15.50
No. 1 busheling	10.00 to	10.50
No. 2 busheling	7.00 to	7.50
Cut forge	12.00 to	12.50
Pipes and flues	8.00 to	8.50
No. 1 railroad wrought	12.00 to	12.50
No. 2 railroad wrought	12.00 to	12.50
Steel knuckles and couplers	15.50 to	16.00
Coil springs	17.00 to	17.50
No. 1 machinery cast	18.00 to	18.50
No. 1 railroad cast	17.50 to	18.00
No. 1 agricultural cast	17.50 to	18.00
Low phos. punchings	14.00 to	14.50
Locomotive tires, smooth	15.00 to	15.50
Machine shop turnings	6.50 to	7.00
Cast borings	8.50 to	9.00
Short shoveling turnings	8.50 to	9.00
Stove plates	15.00 to	15.50
Grate bars	14.00 to	14.50
Brake shoes	15.00 to	15.50
Railroad malleable	16.50 to	17.00
Agricultural malleable	16.00 to	16.50

Possible Scrap From Japan

It has been suggested, says the *Ironmonger*, of London, that, as a result of the earthquake in Japan, large quantities of scrap metal will be available for export from that country. It has been argued that, for every ton of new material ordered by Japan, there must be a ton of scrap metal for disposal and that, even if this estimate is halved to allow for loss in collecting and other causes, the scrap available must represent an enormous tonnage. As it is improbable that there will be much demand for scrap metal in Japan for some time to come, it is reasonable to assume that the Japanese will look for markets for this material in Europe and the United States. Hitherto, however, China has been the principal outlet for Japanese scrap, and it is possible, although not probable, that the Chinese market will be able to absorb the quantities arising from the earthquake. A considerable proportion of the material available must be non-ferrous scrap, as it is reported that there has been great destruction of electrical installations. The possibilities that the British and American scrap markets may suffer a reaction due to supplies of scrap from Japan should, therefore, not be lost sight of.

Trade-mark protection in Europe has been studied by the Department of Commerce and a 29-page pamphlet has been issued as trade information bulletin No. 155, obtainable on application to the Government Printing Office, Washington.

The New Departure Mfg. Co., Bristol, Conn., manufacturer of ball bearings, is advancing production at its new works at Meriden, Conn., recently placed in service. Employment is now being given to close to 800 men, and this will be increased materially during the next 60 days.

New York

Sustained Contracting for Structural Material —Low Pig Iron Prices

NEW YORK, Oct. 30.—More interest has developed in the market and sellers are hopeful that considerable business will develop soon on the part of large buyers who have been awaiting favorable conditions as to price, but the only tonnage of consequence placed within the past week was 2250 tons sold at $21, furnace, by a company on the border of the eastern Pennsylvania district to the American Radiator Co. for delivery at Bayonne, N. J. While $23 continues to be quoted in eastern Pennsylvania on No. 2 plain, $22 can be done and the market seems to be settling to a lower basis. The report of the American Radiator Co. being in the market for from 25,000 to 50,000 tons is not confirmed and the only purchase it is known to have made was for the tonnage for delivery at Bayonne. While $22 continues to be the quotation at Buffalo on No. 2 plain or No. 2X, No. 1X has also been sold at that price and reports of $21 being done on No. 2 plain are persistent.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$24.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	24.27
East. Pa. No. 2, sil. 1.75 to 2.25	24.27
Buffalo, sil. 1.75 to 2.25	$27.41 to 26.91
No. 2X Virginia, sil. 2.25 to 2.75	29.94
No. 2 Virginia, sil. 1.75 to 2.25	29.44

Ferroalloys.—After many weeks of expectation British producers of ferromanganese reduced their price Oct. 24 to $110, seaboard, from $117.50. This has not stimulated business and the market is exceedingly quiet with sales and inquiries confined to carload and small lots, covering filling-in requirements for certain steel producers. Active competition continues to be experienced by British producers with domestic makers who appear to be taking most of the little business offered. There is no activity in the spiegeleisen market nor any change in prices and the same is true regarding the 50 per cent ferrosilicon market.

Cast-Iron Pipe.—Demand continues fair and prices unchanged. Among municipal tenders closed this week was that of Jamestown, N. Y., for 343 tons of 6, 8, 10, 14 and 16-in. pressure pipe and 20,000 lb. of fittings, bids opened Nov. 1, and a tender for 350 tons of 6-in. and 8-in. pipe from Katonah, N. Y., bids opened Oct. 30. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $63.60; 4-in. and 5-in., $68.60; 3-in., $78.60, with $5 additional for Class A and gas pipe. Makers of soil pipe are looking forward to a continuance of present activity until the end of the year, at least, as jobbers are still placing orders at the low discounts prevailing and very little is said to be going into stock. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 35¾ to 40¾ per cent off list; heavy, 45¾ to 50¾ per cent off list.

Warehouse Business.—It is generally expected that total business for October will prove to have been greater than during preceding months. Some of the larger buyers are apparently purchasing from hand-to-mouth out of stock. Despite the present fairly good demand, weakness is still reported in certain products. Black and galvanized sheets continue to bring as low as 4.45c. and 5.45c. per lb. base, while blue annealed sheets, No. 10 gage, are quoted as low as 4.20c. per lb., with sales for export reported at 4.10c. per lb. in isolated cases, where a good-sized tonnage is involved. Free delivery by motor truck over considerable territory continues the rule with most warehouses. The market on wrought iron and steel pipe is more active than for several weeks, and prices are fairly firm. Brass and copper products are down ½c. to 1c. per lb. We quote prices on page 1232.

Finished Iron and Steel.—Activity continues in structural steel, particularly in the metropolitan district, to a degree that sets it apart from other steel products. The demand for other steel products is extremely dull. Plate mills are greatly in need of tonnage, but there has been no improvement in the volume of orders. Prices on plates continue weak, and Eastern mills, almost without exception, will meet the 2.40c. quotation which until recently has been made principally by two of the smaller producers. The Turner Construction Co. will buy 1000 tons of concrete reinforcing bars for the superstructure of the new Western Electric Co. plant at Kearny, N. J. Stange & Walsh, Cleveland, were low bidders on the Baldwin Reservoir, that city, which will require 2000 tons of concrete bars.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Coke.—Prices are practically unchanged, with a slight tendency toward greater firmness. Standard foundry coke is quotable at from $5.25 to $6.25 per ton, depending upon brand and standard furnace at $4 to $4.25 per ton, with medium sulphur slightly firmer at about $3.75 per ton. By-product coke has been reduced 50c. per ton, and producers are contracting on an open price basis for first half of 1924 delivery. By-product coke is now $10.91, Newark and Jersey City, N. J.

Old Material.—The downward movement of prices continues unchecked. No. 1 heavy melting steel has declined to $14.50 per ton, delivered, eastern Pennsylvania, with railroad grade at $14.75 on old orders. Heavy melting steel is going forward to Conshohocken, Pottsville and Bethlehem. Shipments of borings and turnings are still being made to Coatesville at $11.50 per ton delivered. For delivery to a Harrisburg consumer $16 per ton is being paid on stove plate and some shipments are being made at $15.25 to $15.50 to New Jersey consumers. The greatest activity today is in heavy melting steel, but practically all shipments are completing old contracts. Some dealers are showing an inclination to stock up at present prices, while others are awaiting a further decline.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$10.50 to $11.00
Steel rails, short lengths, or equivalent	11.50 to 12.00
Rails for rolling	15.00 to 16.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	15.00 to 16.00
Iron car axles	22.50 to 23.00
No. 1 railroad wrought	14.00 to 14.50
Wrought iron track	13.50 to 14.00
Forge fire	8.00 to 8.50
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	7.50 to 8.00
Machine-shop turnings	7.00 to 7.50
Mixed borings and turnings	7.00 to 7.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.75 to 10.25
Stove plate	12.25 to 12.75
Locomotive grate bars	12.00 to 12.50
Malleable cast (railroad)	16.00 to 17.00
Cast-iron car wheels	15.50 to 16.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00 to $19.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00 to 18.50
No. 1 heavy cast, not cupola size	14.50 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	16.00 to 16.50

Birmingham

Low Pig Iron Prices and Small Shipments— Some Shipments to Japan

BIRMINGHAM, ALA., Oct. 30.—Developments in the pig iron market in the Birmingham district during the past week did not bring about much activity, if any can be claimed. Local melters can get iron at from $1 to $2 per ton lower than previously, and in some instances more than this, while iron being shipped into the Middle West in competition with the Northern furnaces is being sold on a $20 per ton base, and reports will not cease that still lower has been done. The aggregate business of the past week was not up to the production. However, there has been but little talk of further curtailment of the production and the prospects are that the demand may justify the continuation of present conditions. The Gulf States Steel Co. has lighted its single blast furnace at Alabama City, near Gadsden, after thoroughly repairing the plant, and will during this week be making basic iron again. The same company will put in operation three of the open-hearth furnaces. Pig iron melting plants

in the Birmingham district are still sticking to the plan of buying from hand-to-mouth, despite the lowering of prices. A few sales have been made for delivery into next year.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$20.00 to $21.00
Basic	20.00 to 21.00
Charcoal, warm blast	33.00

Cast Iron Pipe.—Lettings the past week were few, but the plants are operating to capacity and will have warrant for this condition for an indefinite period. No change is reported in quotations.

Finished Material.—Some small lot business from the Japanese orders reached the Birmingham district recently, and there has been a little rush to meet ships leaving Mobile and New Orleans. Wire and nails, in particular, have been shipped from here. Expectations are for a larger amount of business from this source. Steel production during the past week has decreased because of mechanical mishaps. More business placed with the steel making, fabricating and finishing mills of the Birmingham district in October than the previous month and prospects now reported as favorable for the remainder of the year. Steel bars are quoted at 2.60c. in Birmingham.

Coke.—No improvement has taken place recently in the coke market in the South, quotations having $7.50 per ton as maximum for foundry coke, with furnace coke down to $6. Production is being maintained, though old contracts are on the wane.

Old Material.—Absolutely no change is reported in the old material market, and quotations are weaker with a few changes.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$18.00 to $19.00
Heavy melting steel	14.00 to 15.00
Railroad wrought	15.00 to 16.00
Steel axles	19.00 to 20.00
Iron axles	23.00 to 24.00
Old steel rails	16.00 to 17.00
No. 1 cast	19.00 to 20.00
Tram car wheels	18.00 to 19.00
Car wheels	17.00 to 18.00
Stove plate	16.00 to 17.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	9.00 to 10.00

Buffalo

Pig Iron Very Weak—Report of Radiator Inquiry Is Not Confirmed

BUFFALO, Oct. 30.— Further weakness in pig iron prices is indicated, but not fully confirmed. Several sales have been made at slightly less than $22, the lowest figure reached up to last week. Total inquiry shows a marked falling off and sales are less than 7000 tons. The entire sales activity of one furnace consisted of a carload of No. 1X iron at $22.50. There is a growing tendency on the part of the Buffalo producers to meet the low priced standard laid out by one of their number. Several furnaces are now quoting $22 for silicon 1.75 to 2.25. It is generally understood that $22 is below cost of actual production and that furnace operation would be materially reduced should any further weakness develop. The reported inquiry said to have been put out by radiator interests for 25,000 to 50,000 tons is not confirmed. Interest exhibited by radiator people is usually the cue to smaller buyers that the time is ripe for placing new business. It is reported that the Tonawanda furnace of the American Radiator Co. will be blown out after the first of the year to permit repairs. Differentials are little regarded.

We quote f.o.b., gross ton, Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$22.50 to $23.50
No. 2 foundry, 2.25 to 2.75 sil.	22.00 to 22.50
No. 2 plain, 1.75 to 2.25 sil.	21.75 to 22.00
Basic	23.00
Malleable	23.00
Lake Superior charcoal	30.28

Finished Iron and Steel.—Bar demand is extremely light, and while prices are holding firm at 2.40c., it does not appear that this strength will be maintained unless a turnabout occurs. A few desirable plate tonnages have come out and these have been closed at 2.50c. Sheet demand is not as brisk as it was earlier in the fall, and while no reduction from the price schedule is announced, desirable tonnages would bring further concessions. Pressure for pipe delivery is strong and new business continues at the same rate.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—Several sales of heavy melting steel at $15 have been made, but the total volume is not sufficient to make a market. The general situation remains dull and trading is extremely light.

We quote f.o.b., gross ton, Buffalo as follows:

Heavy melting steel	$16.00 to $16.50
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	14.00 to 15.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	13.00 to 13.50
No. 1 busheling	14.50 to 15.00
Stove plate	17.00 to 17.50
Grate bars	16.00 to 16.50
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	14.50 to 15.50
Railroad malleable	18.50 to 19.00

St. Louis

Pig Iron Week—Some Southern Sold at $19, Birmingham Base

ST. LOUIS, Oct. 30.—The market for pig iron continues extremely dull. Buying during the last week was almost nothing, and the only inquiry of consequence before the trade is for 1000 tons of foundry iron. Market quotations are merely nominal, and each transaction is a matter of bargaining. While Southern iron is quoted nominally at $20 to $21, Birmingham, sales have been made at $19. Better than $25, Chicago, for Northern iron can be done, it is said, on offers of good-size tonnages.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$27.16
Northern malleable, sil. 1.75 to 2.25	27.16
Basic	27.16
Southern fdy., sil. 1.75 to 2.25 (rail)	$24.17 to 25.17

Finished Iron and Steel.—The Missouri Pacific Railway bought 3500 kegs of track spikes and 2000 kegs of track bolts for use in connection with their recent rail orders. The only other railroad purchase was of 160 car wheels by the same road. No other railroad inquiries are pending. Warehouse business continues dull.

Old Material.—Lack of demand by consumers and additional heavy offering of lists by railroads have caused further weakness in the market for old material, and prices on some items are lower than last week. Railroad lists include: Illinois Central, 12,000 tons; Atchison, Topeka & Santa Fe, 3000 tons; Chicago, Milwaukee & St. Paul, 1500 tons; Chicago, Burlington & Quincy, 4000 tons; Great Northern, 2000 tons; Pennsylvania, Central Region, 14,000 tons; Southwestern, 7500 tons, and Northwestern region, 3000 tons.

Per Gross Ton	
Iron rails	$15.00 to $15.50
Rails for rolling	13.50 to 14.00
Steel rails, less than 3 ft.	15.50 to 16.00
Relaying rails, 60 lb. and under	25.00 to 26.00
Relaying rails, 70 lb. and over	32.50 to 33.50
Cast iron car wheels	17.00 to 17.50
Heavy melting steel	12.00 to 12.25
Heavy shoveling steel	11.75 to 12.00
Frogs, switches and guards cut apart	13.00 to 13.50
Per Net Ton	
Heavy axles and tire turnings	11.00 to 11.50
Steel angle bars	12.00 to 12.25
Steel car axles	15.00 to 15.50
Iron car axles	22.50 to 23.00
Wrought iron bars and transoms	17.00 to 17.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	11.50 to 12.00
Railroad springs	14.00 to 14.50
Cast iron borings	9.00 to 9.50
No. 1 busheling	12.25 to 12.75
No. 1 railroad cast	17.00 to 17.50
No. 1 machinery cast	17.00 to 17.50
Railroad malleable	14.50 to 15.00
Machine shop turnings	9.00 to 9.50
Champion bundled sheets	7.00 to 7.50

Cincinnati

Southern Pig Iron Prices Decline—Silvery Quotations Marked Down

CINCINNATI, Oct. 30.—Prices continue to sag on the pig iron business being placed. The Southern market is at least 50c. a ton lower and southern Ohio iron has dropped a similar amount. Silvery prices have been reduced $2 per ton by Jackson County makers. There is little inquiry current, and sales generally run to carload lots for immediate shipment, but a number of round tonnage lots have been placed. A Tennessee melter bought 1000 tons of malleable for first quarter shipment and a Hamilton melter 500 tons for prompt. A radiator company bought 600 tons for a Northern plant and 400 tons for a Southern plant. An Indiana melter bought 200 tons of charcoal iron at $26, furnace. On an inquiry for 1000 tons from Detroit, Southern furnaces quoted $19.50, Birmingham, but the probabilities are that Northern iron will be bought. A 500-ton inquiry from a radiator company is pending.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.05
Ohio silvery, 8 per cent	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	25.27
Basic Northern	25.27
Malleable	25.27

Finished Materials.—The week has been a dull one in the steel market, orders generally being for one and two-car loads. There has been little buying of plates, and bars also have been quiet, although we note one or two sales of forging quality bars at the full price of 2.65c. Wire products are moving slowly, and prices generally are being maintained, although it is reported that some mills have been offering special concessions to large buyers. A slight improvement is noted in the demand for hoops and bands, and prices are fairly firm. Track materials have been in light demand, but some of the smaller roads in the mining districts of Kentucky, West Virginia and Tennessee have been placing some orders. The Big Four is reported to be about to take bids on its 1924 requirements. Specialties, such as steel castings, car wheels and car axles, have been in fair demand.

Sheets and Tin Plate.—Tin plate has been in good demand the past week, and sales are reported of approximately 40,000 base boxes. Much of this will be stock plate. Blue annealed sheets are also in fair demand and the price is firmly held. Little activity is noted in black or galvanized sheets, and prices are being shaded from $2 to $3 per ton.

Warehouse Business.—Jobbers report a slowing up in orders, particularly for bars, shapes and plates. Wire products are also moving slowly. Blue annealed sheets have been in fair demand, but black and galvanized are quieter. Prices of sheets have been reduced sharply to meet competition from Cleveland and Chicago. Other products, however, are unchanged.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, $3.60c. per 100 lbs.; common wire nails, $3.60 per keg base; cement coated nails, $3.30 per keg.

Structural Activity.—The U. S. Engineers' Office, Louisville, Ky., will open bids Nov. 23 on 20 steel barges, estimated to require about 2500 tons of plates and shapes. This is the only inquiry to come out. The Louisville & Nashville Railroad took bids on 1250 tons of bridge work last week, the Louisville Bridge & Iron Co. being awarded 150 tons, the American Bridge Co. 300 tons, and the Virginia Bridge Co. 800 tons. McClintic-Marshall Co. and the American Bridge Co. are low bidders on 800 tons of plate girder work for the Big Four.

Reinforcing Bars.—Kentucky highway work will require about 200 tons, on which inquiries have appeared. A school at Cincinnati will require an equal tonnage, bids closing Nov. 12. Miscellaneous work makes up a fair total tonnage of reinforcing bars on inquiry, but projects usually run less than 100 tons. Prices of bars are unchanged, the range being from 2.25c. for rerolled bars to 2.40c. for bars rolled from new billets.

Coke.—Only fair activity is noted in coke, the demand being mostly for foundry grade. Prices rule about the same as last week. Connellsville furnace coke is quoted at $3.75 and foundry at $5. New River is quoted at $10 to $11 and Wise County furnace at $5.25 to $5.75, with foundry at $6 to $7. By-product foundry is steady at $9, Connellsville basis.

Old Material.—Japanese inquiries for scrap materials have created some interest, but local business is light. A steel mill bought a small tonnage of turnings at around $9.50, delivered. Some grades are from 50c. to $1 lower. Railroad lists closing this week are estimated to contain 150,000 tons. The high bid on the battleships Constitution and United States was $114,000.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$9.50 to	$10.00
Iron rails	13.00 to	13.50
Relaying rails, 50 lb. and up	27.00 to	27.50
Rails for rolling	13.00 to	13.50
Heavy melting steel	12.00 to	12.50
Steel rails for melting	12.50 to	13.00
Car wheels	12.50 to	13.00
	Per Net Ton	
No. 1 railroad wrought	11.00 to	11.50
Cast borings	7.50 to	8.00
Steel turnings	7.00 to	7.50
Railroad cast	13.50 to	14.00
No. 1 machinery cast	16.50 to	17.00
Burnt scrap	10.50 to	11.00
Iron axles	20.50 to	21.00
Locomotive tires (smooth inside)	12.50 to	13.00
Pipes and flues	6.50 to	8.00

Boston

Buffalo Furnaces Continue to Take Most Pig Iron Business—Coke Price Reduced

BOSTON, Oct. 30.—Buffalo furnaces continue to take most of the available pig iron business in New England, but are meeting stiff competition from one eastern Pennsylvania furnace, heretofore inactive, which has booked several hundred tons at prices equal to or under the Buffalo furnace base equivalent. A Providence, R. I., foundry bought 500 tons No. 1X Buffalo at about $27, delivered, and 400 tons No. 2X eastern Pennsylvania at approximately the same figure. Other invisible Buffalo iron business was closed, involving large tonnages, presumably on a $22 furnace base, with differentials disregarded. Virginia and Alabama iron figure in sales, but only in small lots for mixture purposes. No large inquiries are in the open market, but at least one heater maker will have to buy shortly, not having sufficient iron to carry him through the rest of the year. Generally speaking, foundries are fairly well covered for the remainder of 1923, and are less active than heretofore. A majority of them are taking 60 days to pay their pig iron bills, a few are discounting within 10 days, and a few prepaying on iron in transit.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$26.65 to $28.15
East. Penn., sil. 1.75 to 2.25	26.65 to 27.65
Buffalo, sil. 2.25 to 2.75	26.91 to 27.91
Buffalo, sil. 1.75 to 2.25	26.91 to 27.41
Virginia, sil. 2.25 to 2.75	30.42 to 31.42
Virginia, sil. 1.75 to 2.25	29.92 to 30.42
Alabama, sil. 2.25 to 2.75	*30.60 to 31.10
Alabama, sil. 1.75 to 2.25	*29.60 to 30.60

*Nominal.

Finished Material.—Structural steel generally is quoted at 2.50c., Pittsburgh base, but a few independent mills for a month or more have freely accepted business at 2.40c. Important fabricating tonnage prospects for the remainder of 1923 are few and far between. Two local building jobs and a Springfield, Mass., bridge job involving large tonnages, together with smaller tonnages, will probably be let early in 1924. The market for bars is quiet on a basis of 2.40c., Pittsburgh. Manufacturers and jobbers generally are well covered for the remainder of 1923.

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. have opened their books for first

half of 1924 by-product foundry coke contracts. Such contracts are being taken on a basis of "price ruling date of shipment," a policy followed by both companies during the present year. A large percentage of the New England foundries have covered themselves on these contracts. Both companies also have reduced their price on current shipments against last half 1923 contracts $1 a ton to $12.50 delivered in New England. That price figures back to $9.95 on cars, Connellsville district, whereas good foundry Connellsville cokes are offered at $10.55 to $12.30, delivered.

Old Material.—The outstanding feature of the old material market the past week was the sale of scrap by the Government, on one day at the old Squantum plant of the Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., and on another day at the Charlestown Navy Yard, Boston. Prices paid by dealers in numerous instances were high and out of line with those quoted in the regular market. For instance, one dealer paid $750 for 1500 to 2000 tons of sweepings, quantity not guaranteed, most of the material being under ground. Rails, mostly short lengths, of varying weights, sold at $1.05 per 100 lb., while 77½c. per 100 lb. was paid for soft steel chain studs. In the regular market machinery cast has been moderately active at $22.50 to $22.75, delivered New England, for No. 1. Textile machine, in short supply, sold at differentials running as high as 75c. a ton over No. 1 machinery. Business has slowed down the past day or two, indicating foundries are well stocked. Small tonnages of heavy melting steel sold at $10 and $10.25, shipping point, and occasionally at $10.50. Prices are too low to make it profitable for dealers to ship outside New England. Chemical borings are a little more active at $10, shipping point, with offerings steadily increasing. One dealer paid $7 a ton, shipping point, for mixed borings and turnings since last reports, about 50c. above average market price.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plate	16.00 to 16.50
Railroad malleable	20.00 to 21.00
Street car wheels	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.00 to $10.50
No. 1 railroad wrought	12.00 to 12.50
Wrought pipe (1-in. in diam., over 2 ft. long)	10.50 to 11.00
Machine shop turnings	6.50 to 7.00
Cast iron borings, rolling mill	6.50 to 7.00
Cast iron borings, chemical	9.50 to 10.00
Blast furnace borings and turnings	6.00 to 6.50
Forged scrap and bundled skeleton	6.50 to 7.00
Shafting	15.00 to 15.50
Street car axles	18.00 to 18.50
Rails for rerolling	12.00 to 12.50

Cleveland

Ore Movement Will Be About 57,000,000 Tons—Pig Iron Dull and Weak

CLEVELAND, Oct. 30.—Iron ore shipments for October will be about 8,000,000 tons, or 1,000,000 tons greater than estimated early in the month and making the movement up to Nov. 1 approximately 54,000,000 tons. Present indications point to a movement of at least 57,000,000 tons for the season as compared with early in season estimates of a movement of 55,000,000 to 56,000,000 tons.

Pig Iron.—There was little activity in the market during the week and sales were confined almost wholly to orders for November and December shipment. The market still lacks firmness and consumers are not inclined to purchase iron beyond their early needs. Many of the sales during the week ranged from carlots to 100 tons. Locally prices are unchanged at $24 at furnace for foundry iron for Cleveland delivery and around $23 for outside shipment. In the Mahoning Valley, quotations range from $22.50 to $23, small lot sales being made at the latter price. Buffalo foundry iron is commonly quoted at $22. In the southern Ohio district, a 300-ton lot sale was made at $23.50. We note the sale of 1000 tons of foundry and malleable iron to a northern Ohio consumer for early shipment. One producer has several inquiries pending for lots aggregating 4000 tons. Although a report has been circulated that the American Radiator Co. has an inquiry out for round tonnage, the only inquiry that has reached Cleveland producers from that company is for 650 tons for its Springfield plant. Small lot sales of Southern foundry iron are reported at $20.50, Birmingham, but $20 is the price for fair sized lot. Prices on Ohio silvery iron have been reduced $2 a ton to $32.50 for 8 per cent, this being the first change in the silvery schedule for some time. Sales for October by leading producers in this territory were about equal to those in September and two leading interests report that their shipments in the present month have about equalled their production. The Otis Steel Co. will blow out one of its Cleveland furnaces this week. Another lake furnace is scheduled to go out shortly.

A Cleveland producer has sold 2500 tons of basic iron on the basis of $22.50 Valley furnace. There are reports that foundry iron is being offered at $22 and possibly lower in the Valley district.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$22.50
Northern No. 2 fdy., sil. 1.75 to 2.25	24.50
Southern fdy., sil. 1.75 to 2.25	25.50 to 26.00
Malleable	24.50
Ohio silvery, 8 per cent	35.52
Standard low phos., Valley furnace	30.00

Alloy Steel.—Buying by the automobile industry has increased, some good orders having come from several leading Detroit car builders and mills have much better order books than a month ago. Prices appear firm at the recent reductions.

Reinforcing Bars.—The Bourne-Fuller Co. has taken 500 tons for a warehouse for the Harnett-Jewett Co., Toledo. An inquiry has come out for an unnamed tonnage for the Third National Bank Building, Dayton, Ohio. Rail steel bars are weaker with a 2.15c. to 2.20c. price as the common quotation.

Sheets.—The demand for automobile body sheets has improved and mills making these sheets are comfortably filled for the next few weeks, but car builders are buying only for early requirements. Several Valley district mills are more comfortably fixed than a few weeks ago because of Japanese orders. Most of the black sheet business is being taken at 3.75c. and mills that will not meet this price have been compelled to further curtail operations. Blue annealed sheets are firm and very little shading is reported on galvanized sheets.

Semi-finished Steel.—A Cleveland mill has taken an additional 2000-ton lot of sheet bars for making sheets for Japan at the regular $42.50 price, this being the only activity reported. Quotations on billets and slabs range from $40 to $42.50.

Finished Material.—A few of the mills report some improvement in prospective business, but the market as a whole continues quiet. A leading producer reports an increase in size of orders, although the number of orders shows no gain. The aggregate tonnage booked in this territory by this producer increased approximately 50 per cent in October over September. The Nickel Plate System has sent out an inquiry for 27,000 to 28,000 tons of rails and is expected to come in the market shortly for track accessories to go with these rails. This inquiry covers the rail requirements of Nickel Plate, Clover Leaf and Lake Erie & Western lines for 1924. New inquiries from manufacturing companies are mostly for early requirements to replenish reduced stocks, but one Ohio consumer has virtually closed for 1000 tons of steel bars for first quarter delivery at the regular 2.40c. price. However, buyers generally are still looking for lower prices and are deferring purchases as much as possible. Prices on steel bars and structural material are firm. Efforts to break regular prices seem to be centered at present largely on plates. To meet competition in the Chicago territory, an Ohio mill has shaded plates to 2.40c. Eastern mills have been holding to 2.50c. for plates for

shipment to this territory, but one mill has shaded this price to 2.40c., which figures back to higher than the regular Pittsburgh base owing to the higher freight rate. There are rumors that the Pittsburgh base price is being shaded for this territory, but these have not been substantiated. Ohio shops are figuring on work in Denver requiring 1000 tons of plates. Steel bar orders include one from a Canton, Ohio, consumer for about 1200 tons for railroad specialty work. Irregularity continues in hot-rolled strip steel prices with quotations as low as 2.75c. for wide material, although some mills are not going below 3c. Light hoops have sold at the regular 3.15c. hoop price. The Stenge-Walsh Construction Co. was low bidder for an administration building, filtering houses and other work in connection with the Baldwin Reservoir, Cleveland. This work will require 600 tons of structural material, 2000 tons of reinforcing bars and 1360 tons of cast iron pipes and fittings.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.50c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Bolts, Nuts and Rivets.—The demand for bolts, nuts and rivets has declined. There is little new buying and specifications are mostly for small lots for early requirements. Rivet prices appear to have settled down from 2.75c. to 2.85c. except for small miscellaneous lots, for which some makers are still getting up to 3c.

Coke.—The foundry coke market is very dull and the supply is in excess of the demand. Some producers who have been comfortably filled with orders are getting to the point where they need business and one producer who has been holding to $7.25 for high grade foundry coke has reduced its price to $6.50. Other standard Connellsville brands are quoted at $5.

Old Material.—Prices have declined on several grades and the market is still weak. Heavy melting steel is being offered at $15 delivered, Cleveland, and a small tonnage has been sold at that price. However, dealers have paid $14.75 to $15 local yard for that grade to fill old contracts with Cleveland mills. Heavy melting steel is being offered freely in the Valley district at $16 delivered and some small lot sales are reported at that price. Borings and turnings are a drug on the market and have declined 50c. or more a ton. There is no local demand for bushelings and flashings, which have been marked down about $1.50.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$14.50 to $15.00
Rails for rolling	17.50 to 18.00
Rails under 3 ft	16.75 to 17.00
Low phosphorus melting	18.00 to 18.25
Cast borings	10.50 to 11.00
Machine shop turnings	10.25 to 10.50
Mixed borings and short turnings	10.50 to 11.00
Compressed sheet steel	12.75 to 13.00
Railroad wrought	12.75 to 13.00
Railroad malleable	18.50 to 19.00
Light bundled sheet stampings	10.00 to 10.25
Steel axle turnings	11.75 to 12.00
No. 1 cast	20.00 to 20.50
No. 1 busheling	9.00 to 9.50
Drop forge flashings	9.50 to 10.00
Railroad grate bars	15.50 to 16.00
Stove plate	15.50 to 16.00
Pipes and flues	9.50 to 10.00

The Amalgamated Motors Corporation, Plainfield, N. J., has been organized with capital of $1,000,000 and 250,000 shares of common stock, to take over and consolidate the American Motors Corporation, Plainfield; Bessemer Motor Truck Co., Grove City, Pa.; Northway Motors Corporation, Natick, Mass.; and the Winther Motor Co., Kenosha, Wis., all manufacturers of motor trucks and parts. The first two companies were merged recently as the Bessemer-American Motors Corporation, with headquarters at Philadelphia. Proctor W. Hansel, president of the latter consolidation, will head the new organization, which purposes to expand the different operating units. Irad M. Lewis, formerly president Bessemer Company, and Ralph D. Mock, previously vice-president Hydraulic Pressed Steel Co., will be prominent in the Amalgamated company.

Philadelphia

Another Drop in Pig Iron Prices—Steel Sales Improve Slightly

PHILADELPHIA, Oct. 30.—Eastern pig iron prices have taken another drop, two fairly large transactions having brought out prices as low as $22.13 and $22.50, delivered, on foundry grades. In one instance the furnace quotation was $21 on both No. 2 plain and No. 2X, the lowest point that the market for this district has reached since the spring of 1922.

Some of the steel companies' sales offices report that tonnage booked in October showed a slight gain over September, and prospects are somewhat better at the beginning of November than they were 30 days ago. Orders are small, lots of more than a carload being the exception, but there is a greater number of these small orders. Other than a more general acceptance of 2.40c., Pittsburgh, on plates by Eastern mills, there is no important change in the steel price situation.

Further declines in old material have brought prices to a point where some dealers prefer to accumulate rather than to sell. Demand from consumers is at a minimum.

Pig Iron.—A further decline in foundry pig iron prices developed in two fairly important transactions of the past few days. A cast iron pipe company bought from 5000 to 7500 tons of iron analyzing 1.25 to 2.25 per cent silicon from two or three nearby furnaces at a delivered price of $22.50. In the case of the furnace having the highest rail freight rate, the net price at furnace was about $21.50, due to the ability of the shipper to obtain a water rate of $1 a ton. A New Jersey radiator plant bought 2500 tons of foundry iron, part No. 2 plain and part No. 2X, at a uniform price of $21, furnace, or $22.13, delivered. This furnace has a freight rate to Philadelphia of $1.64, making its price on this transaction equivalent to $22.64, Philadelphia, for both No. 2 plain and No. 2X. There is a sharp distinction in the prices being quoted on carload lots and large lots. The buyer of a carload will have difficulty in getting better than $23, furnace, for No. 2 plain and No. 2X, but every large inquiry is subject to special consideration. Pig iron sellers see no hope of a recovery in prices until more furnaces have gone out of blast and present large stocks in furnace yards have been worked down considerably. The Reading Iron Co. is putting the Keystone furnace out of blast, and will also let the Thomas furnace at Hokendauqua, Pa., go out soon. Further curtailment of production in this district is expected. Only three furnaces in Virginia are now active, and there is little demand there for iron. A Virginia cast iron pipe company bought 1500 or 2000 tons last week, some of it off-grade iron, at $24, furnace. There is no demand for basic and gray forge, but in line with lower prices on foundry iron it would be possible to buy either grade at $23 to $24, furnace. One thousand tons of French iron arrived at this port last week.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$22.64 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.64 to 24.63
East. Pa. No. 1X	23.76 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivered eastern Pa.	23.00 to 24.00
Gray forge	23.00 to 24.00
Malleable	23.00 to 24.00
Standard low phos. (f.o.b. furnace)	28.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Iron Ore.—Ore receipts from abroad in the past two weeks were as follows: From Sweden, 14,104 tons; from Spain, 11,455 tons; from French Africa, 14,450 tons.

Ferroalloys.—British makers of ferromanganese have notified their American agents to quote $110, seaboard, a reduction of $7.50 a ton. This price is in line with recent sales by domestic furnaces and with

prices at which resale lots have been sold. Spiegeleisen is nominally quoted at $44 to $45, furnace, with few sales.

Coke.—Foundry coke is freely offered at $5, Connellsville; furnace coke at $4, while some distress coke is occasionally offered at $3.75.

Semi-Finished Steel.—There is little demand for billets, and quotations seem fairly uniform at $40 for rerolling quality and $45 to $47.50 for forging quality, Pittsburgh base.

Plates.—A slight improvement in the demand for plates is reported by some of the Eastern mills. With possibly one exception, Eastern mills are quoting 2.40c., Pittsburgh, and while Pittsburgh mills continue to quote 2.50c., it is becoming difficult for them to obtain specifications on their 2.50c. contracts.

Structural Shapes.—A fair number of small orders is coming to Eastern mills, but there are no building projects in this district requiring large tonnages. The range of quotations is 2.40c. to 2.50c., Pittsburgh, the former price being quoted by the smaller mills.

Bars.—Mills continue to quote 2.40c., Pittsburgh, and are getting a considerable number of small orders, many of them less than carload lots. Bar iron is being held at 2.35c., Pittsburgh, with little demand.

Sheets.—Black sheets at 3.75c. and galvanized at 4.90c., Pittsburgh, are more easily obtainable, but blue annealed remains firm at 3c.

Warehouse Prices.—Local warehouses have reduced prices on hot-rolled products in line with an easier mill situation. We quote as follows for local delivery:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ⅛ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅛-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅛-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Rails.—The Pennsylvania has not issued formal orders for the 200,000 tons of rails it will buy, but it is understood that the Bethlehem Steel Co. will be awarded 96,000 tons, Inland Steel Co., 12,000, and the remainder will go to the Steel Corporation.

Old Material.—The scrap market continues weak, with some further price declines. A consumer of bundled sheets and turnings for steel works use which had reduced its price to $10.50, delivered, was obliged to raise it to $11 because of inability to get sufficient material at the lower figure. Many dealers are holding yard stocks in the belief that prices are scraping bottom and that it is a good time to accumulate.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00
Scrap rails	15.00
Steel rails for rolling	$17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	20.00 to 21.00
Couplers and knuckles	18.00 to 19.00
Cast-iron car wheels	18.00 to 19.00
Rolled steel wheels	17.50 to 18.00
No. 1 railroad wrought	17.00 to 17.50
No. 1 yard wrought	15.50 to 16.00
No. 1 forge fire	11.00 to 11.50
Bundled sheets (for steel works)	11.00
Mixed borings and turnings (for blast furnace use)	11.00
Machine shop turnings (for steel works use)	11.00
Machine shop turnings (for rolling mill use)	11.50 to 12.00
Heavy axle turnings (or equivalent)	12.00 to 13.00
Cast borings (for steel works and rolling mills)	11.50 to 12.00
Cast borings (for chemical plants)	15.00 to 16.00
No. 1 cast	19.00 to 19.50
Heavy breakable cast (for steel plants)	16.00 to 16.50
Railroad grate bars	16.00 to 16.50
Stove plate (for steel plant use)	16.00 to 16.50
Railroad malleable	17.00 to 17.50
Wrought iron and soft steel pipes and tubes (new specifications)	14.00 to 14.50
Shafting	20.00 to 21.00
Steel axles	18.50 to 19.50

BRITISH WAR STOCKS WANING

Will Be Entirely Sold or Otherwise Disposed of in Another Few Months

WASHINGTON, Oct. 16.—In a few more months surplus war stocks of the British Government will be entirely sold or otherwise disposed of and one more feature of economic disruption resulting from the war will have been removed, says Trade Commissioner C. E. Lyon in a report to the Department of Commerce. Only £10,000,000, or 3 per cent of the total, remains to be put upon the market.

A recent report of the Commission gives the total sales, to April, 1923, as £322,229,839. Sales have mainly been made within the United Kingdom, where the total amounted to £232,314,555, or 72 per cent. Sales to France and Belgium totaled £42,989,284; to India, £8,770,246; to Iraq, £8,296,717; to Egypt and Palestine, £7,796,653; to the Army of the Rhine, £3,325,316; to the United States and Canada, £2,991,883; and the remainder in small lots to other foreign countries.

Of sales within the United Kingdom, the largest item was textile and leather equipment, followed by chemicals and explosives, plant and machinery, railway material, dock equipment, ferrous metals, transport, non-ferrous metals, building materials, factories, aircraft stores, raw materials and various miscellaneous stores.

In addition to the £322,000,000 represented by general sales, there was an additional £320,000,000 of sales of raw materials purchased on trading accounts.

Iron and Steel Production in Canada

In its monthly report the Dominion Bureau of Statistics states that the production of pig iron and ferroalloys in Canada in September was 75,216 tons, a decline of 18.8 per cent from the August production of 92,587 tons. The production of basic pig iron was 27.5 per cent less at 46,580 tons; foundry iron amounted to 17,536 tons, a decline of 29.8 per cent while malleable iron showed an increase of 32 per cent to a total of 11,100 tons. As usual, practically the whole output of basic pig iron reported was made for the use of producing firms, but the slackening demand for iron was reflected in the lowered output. September tonnage made for use was only about two-thirds of that reported in August.

The low output of pig iron in September was reflected in a decreased production of steel ingots and castings, the absolute quantity being 66,334 gross tons as compared with 105,056 tons, the preceding month. Practically the whole of this decline was in the production of basic open-hearth steel ingots for the further use of the reporting companies, production of direct steel castings remaining at about the same level as during August.

Detroit Scrap Market

DETROIT, Oct. 30.—More interest was shown in the recent letting by one of the largest producers of approximately 4000 tons of miscellaneous scrap than the offerings for October, and the bidding brought out the lowest prices of the year. Declines of from $1 to $2 were registered in the different grades of old material. There is no evidence as yet of much storing of scrap on dealers' yards.

The following prices are quoted on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile cast and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$11.50 to $12.50
Shoveling steel	11.50 to 12.50
No. 1 machinery cast	16.00 to 17.00
Cast borings	8.50 to 9.35
Automobile cast scrap	22.00 to 23.00
Stove plate	15.00 to 16.00
Hydraulic compressed	9.50 to 10.50
Short turnings	8.75 to 9.25
Long turnings	7.00 to 7.85
Flashings	8.25 to 9.35

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.25c.
Double refined iron bars, base, per lb.....4.85c. to 5.00c.
Stay bolt iron bars, base, per lb.....3.00c. to 8.50c.

Hot-Rolled Flats

Hoops, base, per lb.....3.15c.
Bands, base, per lb.....3c. to 3.15c.
Strips, base, per lb.....3c. to 3.15c.
Cotton ties, per bundle of 45 lb.....$1.63

Cold-Finished Steels

Bars and shafting, base, per lb.....3c. to 3.25c.
Bars, S. A. E. Series, No. 2100.....4.50c. to 4.75c.
Bars, S. A. E. Series, No. 2300.....6.50c. to 6.75c.
Bars, S. A. E. Series, No. 3100.....5.50c. to 5.75c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb..... 2.90
Spring wire, base, per 100 lb..... 3.70
Galvanized wire, No. 9, base, per 100 lb..... 3.35
Galvanized barbed, base, per 100 lb..... 3.80
Galvanized staples, base, per keg..... 3.80
Painted barbed wire, base, per 100 lb..... 3.45
Polished staples, base, per keg..... 3.45
Cement coated nails, base, per count keg..... 2.70
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads
60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads..60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads.60 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....60 per cent off list
Lag bolts .....65 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads .....50 per cent extra
Machine bolts, c.p.c. and t. nuts ⅜ x 4 in.,
50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....4.25c. off list
Hot pressed nuts, tapped.....4.25c. off list
C.p.c. and t. square or hex. nuts, blank.....4.00c. off list
C.p.c. and t. square or hex. nuts, tapped.....4.00c. off list
Semi-finished hex. nuts:
⅝ in. and smaller, U. S. S.....80 and 5 per cent off list
⅞ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes S. A. E.....80, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
70 and 10 to 65 and 5 per cent off list
Washers .....5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex head cap screws....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.$2.75 to $2.85
Small rivets .....65 and 10 to 70 off list

Track Equipment

Spikes, ⅜ in. and larger, base, per 100 lb..... $3.15
Spikes, ½ in., ⅝ in. and ¾ in., per 100 lb.....$3.15 to 3.50
Spikes, ⅞ in. ..... 3.15 to 3.50
Spikes, boat and barge, base, per 100 lb..... 3.50
Track bolts, ¾ in. and larger, base, per 100 lb.. 4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.. 5.00 to 5.50
Tie plates, per 100 lb..... 2.55 to 2.60
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	12
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	30½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1⅝ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		

Hot Rolled			
3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2¼ in. O.D. 12 gage	17	5⅝-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
8-lb. coating I. C.	11.30	25-lb. coating I. C.	16.20
12-lb. coating I. C.	12.70	30-lb. coating I. C.	17.35
15-lb. coating I. C.	13.95	35-lb. coating I. C.	18.35
		40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic.	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown Comb.	0.19	Kansas City (pipe)	0.705
Baltimore, export	0.225	Detroit	0.29	St. Paul	0.60
New York, domestic	0.34	Cincinnati	0.29	Omaha	0.735
New York, export	0.255	Indianapolis	0.31	Omaha (pipe)	0.705
Boston, domestic	0.365	Chicago	0.34	Denver	1.27
Boston, export	0.255			Denver (pipe)	1.215

Pacific Coast	$1.15
Pac. Coast, ship plates	1.34
Birmingham	0.58
Memphis	0.56
Jacksonville, all rail	0.70
Jacksonville, rail and water	0.415
New Orleans	0.67

The minimum carload to most of the foregoing points is 6000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	10.50c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	42c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	39c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	110.00
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	$42.00 to 45.00
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	41.00 to 44.00
Ferrosilicon, 50 per cent, delivered, per gross ton	82.50 to 85.00
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	30.00
Silvery iron, 7 per cent, per ton, furnace	31.00
Silvery iron, 8 per cent, per ton, furnace	32.50
Silvery iron, 9 per cent, per ton, furnace	34.50
Silvery iron, 10 per cent, per ton, furnace	36.50
Silvery iron, 11 per cent, per ton, furnace	39.80
Silvery iron, 12 per cent, per ton, furnace	43.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines			$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines			23.50
Per 1000 f.o.b. works:			
Fire Clay:	High Duty	Moderate Duty	
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00	
Maryland	47.00	42.00	
Ohio	42.00 to 43.00	37.00 to 39.00	
Kentucky	42.00 to 43.00	37.00 to 39.00	
Illinois		37.00 to 42.00	
Missouri	42.00 to 45.00	35.00 to 40.00	
Ground fire clay, per net ton		6.00 to 7.00	
Silica Brick:			
Pennsylvania			42.00
Chicago			49.00
Birmingham			50.00
Ground silica clay, per net ton			8.00
Magnesite Brick:			
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)			65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)			40.00
Chrome Brick:			
Standard size, per net ton			50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00 to $42.50
Rolling billets, 2-in. and under	40.00 to 42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$40.00 to $42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	3 per ton over base
Wire rods, carbon 0.41 to 0.55	5 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10 per ton over base
Wire rods, acid	15 per ton over base
Skelp, grooved, per lb	2.40
Skelp, sheared, per lb	2.40
Skelp, universal, per lb	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb	2.15c. to 2.25c.
Rails, light, rerolled base, per lb	1.90c. to 2.00c.
Spikes, $\frac{7}{16}$-in. and larger, base, per 100 lb	$3.15
Spikes, ½-in., $\frac{7}{12}$-in. and ⅝-in., base per 100 lb.	$3.15 to 3.50
Spikes, $\frac{1}{16}$-in., base, per 100 lb	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb	3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb	2.55 to 2.60
Angle bars, per 100 lb	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb	2.15c. to 2.25c.
Ground shafting, base, per lb	3.65c.
Cut nails, base, per keg	$3.15 to $3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000	
	S. A. E.	U. S. S.
¼-in.	$ 4.80	$ 4.80
$\frac{5}{16}$-in.	5.50	6.00
⅜-in.	6.50	7.00
$\frac{7}{16}$-in.	9.00	9.50
½-in.	11.00	11.50
$\frac{9}{16}$-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1-in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½-in.	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(½% Nickel, 10 to 20 per cent Carbon)	$3.00 to $3.25
2300 (3½% Nickel)	5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.50 to 3.75
5200*(Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

FABRICATED STEEL BUSINESS

Awards Amount to About 17,300 Tons, With New Business Pending Less Than 5000 Tons

Structural steel awards the past week at over 17,300 tons exceed those of last week by about 6000 tons. Railroad work accounts for nearly 6000 tons, a wharf for the Baltimore & Ohio taking 3000 tons. The remainder is made up of about 20 items of miscellaneous orders, the largest of which is a public school calling for 1500 tons. New inquiries, amounting to less than 5000 tons, are the smallest in several weeks.

Gas holder at Honolulu, H. I., 700 tons of plates, to Cruse-Kemper Co., Ambler, Pa.

Vanderbilt University, Nashville, Tenn., addition, 400 tons, to an unnamed fabricator.

Baltimore & Ohio Railroad, pier at Baltimore, 3000 tons, to American Bridge Co.

New York, New Haven & Hartford, bridge repairs at Boston, 400 tons, to American Bridge Co.

Childs Restaurant, Coney Island, New York, 350 tons, to Levering & Garrigues Co.

Public School No. 107, Flushing, N. Y., 1500 tons to Hinkle Iron Co.

Paterno apartment house, West End Avenue and 103d Street, New York, 1250 tons, to Paterson Bridge Co.

Greenbaum loft building, 256 West Thirty-eighth Street, New York, 1000 tons, to Levering & Garrigues Co.

Institute for the Blind, New York, 100 tons, to Hay Foundry & Iron Works.

Mercy High School, Chicago, 612 tons, to American Bridge Co.

Snake River Bridge, Ontario, Ore., 438 tons, to Minneapolis Steel & Machinery Co.

Missouri Pacific Railroad, 11 spans, 349 tons, to American Bridge Co.

Buckeye Coal Co., tipple and hoist house, Nemocolin, Pa., 965 tons, to John Eichleay, Jr., Pittsburgh.

American Smelting & Refining Co., washery building, Rosita, Mexico, for subsidiary, 470 tons, to United States Steel Products Co.

Knights of Columbus Building, Springfield, Ill., 290 tons, to St. Louis Structural Steel Co.

United States Gypsum Co., warehouse addition, Oakfield, N. Y., 170 tons to Pittsburgh Bridge & Iron Co.

Whiting Corporation, four 120 ft. box girders for crane bridges, 250 tons, to Bethlehem Steel Corporation.

Swift & Company, eight 80-ft. deck plate girder spans, 400 tons, to Milwaukee Bridge Co.

Louisville & Nashville Railroad, 1250 tons, bridge work; 150 tons to Louisville Bridge & Iron Co., 300 tons to American Bridge Co., 800 tons to Virginia Bridge & Iron Co.

Big Four and Cincinnati Northern Railroads, 850 tons, American Bridge Co. and McClintic-Marshall Co. low bidders on equal tonnages.

Standard Sanitary Mfg. Co., Tiffin, Ohio, additions, 450 tons, to McClintic-Marshall Co.

Leland-Gifford Co., Putnam, Conn., foundry addition, 100 tons, to McClintic-Marshall Co.

Chevrolet Motor Co., Detroit, plant extensions, 385 tons, to McClintic-Marshall Co.

Buick Motor Car Co., Flint, Mich., plant extensions, 1200 tons to Whitehead & Kales.

Toledo Safety Building, Toledo, Ohio, 350 tons, to Donovan Wire & Iron Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Public Service Corporation, power plant at Kearny, N. J., mentioned last week as requiring 14,000 tons; bids now being taken on first section, 7500 tons. Total may exceed 14,000 tons.

Alexander Hamilton Hotel, Paterson, N. J., 1100 tons; former bids rejected.

James Munroe High School, New York, 3000 tons; bids close Tuesday, Oct. 30, previous bids having been rejected.

Y. M. C. A. building, Paterson, N. J., 500 tons.

Union Stock Yards, Omaha, viaduct, 1200 tons.

Union Pacific Railroad, overhead highway crossing, Riverdale, Utah, 105 tons.

Junior high school, Fall River, Mass., 200 tons.

U. S. Engineers' Office, Louisville, Ky., 20 steel barges, approximately 2500 tons, bids close Nov. 23.

Ford Motor Co., Detroit, addition to foundry, 100 tons.

Nurses Home, Erie, Pa., 100 tons.

Harding Junior High School, Lakewood, Ohio, 200 tons. New bids taken.

RAILROAD EQUIPMENT BUYING

Inquiries for New Cars Light—New Business in Locomotives Small

With no orders for cars reported and with new inquiries calling for about 2100, the week has been a meagre one. Of these the largest inquiry is 1547 cars for the Baltimore & Ohio. Locomotives ordered totaled only 43, with no fresh inquiries reported. A summary follows:

In addition to the 25 locomotives placed by the Southern Pacific with the Baldwin Locomotive Works, as reported a week ago, this road has contracted with the American Locomotive Co. for building 18 Mountain type locomotives.

The Delaware, Lackawanna & Western Railroad has ordered 25 locomotives from the American Locomotive Co., of which 10 are Mikado type, 10 Pacific type and 5 Mountain type.

The Great Northern Railroad is in the market for 500 stock cars with steel construction.

It is expected that the Baltimore & Ohio Railroad will award orders this week for 1547 cars, for which it recently inquired.

The Philadelphia & Reading has asked for prices on 50 stock cars and 20 caboose cars.

The Chesapeake & Ohio wants prices on 25 caboose cars.

The Lehigh Valley is in the market for 25 refrigerator cars for milk.

The Nickel Plate has withdrawn an inquiry for repairs on from 100 to 200 box cars and on a similar number of gondola cars.

Mill Activity Declines in the Mahoning Valley

YOUNGSTOWN, Oct. 30.—Rolling mill output in the Mahoning Valley declines this week, while the number of active blast furnaces is increased by one, with the addition of Anna stack, at Struthers, operated by the Struthers Furnace Co., to the furnaces in action. This stack, suspended Sept. 1 because of the dullness in the merchant iron market, has been ordered in blast Nov. 1, and will run on foundry iron. It increases the number of active furnaces in the Youngstown district to 28, of 46.

An attempt will be made to operate the stack on three 8-hr. shifts. It is assured of a continuous run until next Spring, by which time it is believed the pig iron market will be much more active than it is at present.

In contrast with this resumption, however, is the decline in finishing mill schedules in this territory. Of the 120 sheet and jobbing mills in the Mahoning Valley, but 68 were scheduled for operation this week, below the record of last year at this time. The Youngstown Sheet & Tube Co. has suspended for the time being its Western Reserve and Brier Hill sheet mill departments, and has but 12 of its 42 sheet mills under power. The active rolling mills are at its East Youngstown plant.

The Mahoning Valley Steel Co., Niles, has reduced the number of its active mills from six to five.

Independents are maintaining steel ingot output on the following basis—Sheet & Tube Co., 65 per cent; Republic Iron & Steel Co., 70 per cent; Trumbull Steel Co. and Sharon Steel Hoop Co., 100 per cent.

The plate mill of the Republic Iron & Steel Co. is not averaging more than two days per week.

S. S. French, vice-president and general manager of the General Fireproofing Co., Youngstown, states there has been improvement in recent inquiry and that the immediate outlook is encouraging. He believes it will take five years for this country to catch up with its construction requirements. President W. H. Foster of the same company points out that in the past 10 years the increase in the cost of building has not been as great as the increase in wage rates.

The Jones & Laughlin Steel Corporation has moved its Cleveland sales office from the Rockefeller Building to 1409 Union Trust Building.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Oct.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
24.....	13.00	12.25	41.75	6.85	6.55	6.65	6.30
25.....	13.00	12.12½	42.37½	6.75	6.45	6.67½	6.32½
26.....	13.00	12.00	42.37½	6.75	6.45	6.70	6.35
27.....	13.12½	12.12½	....	6.75	6.45	6.67½	6.32½
29.....	13.00	12.25	41.50	6.75	6.45	6.67½	6.32½
30.....	13.00	12.25	41.50	6.75	6.45	6.67½	6.32½

*Refinery quotation; dlivered price ¼c. higher.

New York

NEW YORK, Oct. 30.

Business is of small proportions in all the markets and prices are generally lower. Copper, after receding, is advancing again. Tin has been a little more active and slightly stronger. Lead is in moderate demand but a little lower, and the zinc market is a drifting one.

Copper.—The electrolytic copper market continued to decline during the last week until the lowest prices in many months were recorded. Yesterday and today, however, a turn for the better has taken place and the lowest prices apparently have been eliminated. No metal below 12.50c., delivered, appears now to be available, and some companies are asking 12.62½c., delivered. There are two substantial inquiries before the market, involving several million pounds. It is reported that wire mills are well booked even into next year, but that business in brass shows but little sign of improvement, with order books very lean.

Tin.—Compared with recent weeks the past one has been fairly active. The most animated day was Wednesday, Oct. 24, when 350 to 400 tons changed hands with consumers taking over half and with most of the business done at 41.37½c. to 41.75c., with much of it for London account. A feature of the closing days of the month has been the scarcity of spot tin with the October position tight. Spot Straits tin was quoted today at 41.50c., New York, with the market fairly active. London quotations today were £206 5s. for spot standard, £203 7s. 6d. for future standard and £207 5s. for spot Straits, all about £3 per ton higher than a week ago. Arrivals thus far this month have been 6855 tons, with 4119 tons reported afloat.

Lead.—The feature of the market has been a reduction on Oct. 25 by the leading interest from 6.85c. to 6.75c., New York. Some surprise resulted because of the much higher prices obtaining in London, but this is explained partly by the fact that the American market at present is entirely independent of any foreign quotation and that the latter are so much lower than those prevailing here that they have no effect from either an export or import point of view. The same applies also to Mexican lead. The Western market is somewhat easier than a week ago at 6.45c., St. Louis, with the outside market in the East on the same level as that of the leading interest, or 6.75c., New York.

Zinc.—This market is characterized as one devoid of feature and largely of a drifting nature. Prices for prime Western have backed and filled during the week with business very moderate in volume. Domestic demand is light and foreign sales are slack. Prime Western is quoted and has been sold in carload lots at 6.32½c., St. Louis, or 6.67½c., New York. It is stated that with ore $40 per ton, at which heavy sales were made last week, the cost of refining zinc is at least 6.50c.

Nickel.—Shot and ingot nickel are quoted unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside market quotations for both shot and ingot nickel are 29c. to 32c.

Antimony.—Because of a further scarcity in China, wholesale lots of Chinese metal have continued to advance and are quoted today as high as 8.50c., New York, duty paid, for early delivery.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 25c. to 26c. per lb., duty paid, New York, with some sellers unable to obtain the metal from their principals.

Old Metals.—The market is depressed and business is quiet. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.50
Copper, heavy and wire	11.50
Copper, light and bottoms	10.00
Heavy machine composition	10.00
Brass, heavy	7.25
Brass, light	6.00
No. 1 red brass or composition turnings	8.50
No. 1 yellow red brass turnings	6.50
Lead, heavy	6.50
Lead, tea	5.50
Zinc	5.00
Cast aluminum	16.25
Sheet aluminum	16.25

MANUFACTURERS MEET

Annual Convention of American Manufacturers' Export Association Considers American Trade Prospects and European Tangle

The fourteenth annual convention of the American Manufacturers' Export Association was held at the Waldorf-Astoria Hotel, New York, Oct. 24, 25 and 26. While the slogan for the convention was "American-Made Products in All Markets," there was a strong tendency by most of the speakers to direct their addresses toward the present European situation. The association maintained the precedent of former conventions in the number of men prominent in business and world affairs who spoke at the various sessions and at the luncheon and dinner.

Among the features of the convention was an exhibit which included shipping companies, brokers, code companies, publishers and several manufacturers—among these Westinghouse Electric International Co., Royal Typewriter Co., Splitdorf Electrical Co., Wheeling Steel Corporation. The following countries were represented with information booths: Colombia, Chile, Peru, Sweden, Czecho-Slovakia, Costa Rica, Brazil, Argentine and the Pan-American Union. In addition the National Foreign Trade Council presented an exhibit displayed on several bulletin boards, of export advertising.

On Thursday, Julius H. Barnes, president Chamber of Commerce of the United States, addressed a luncheon held under the auspices of the National Foreign Trade Council. E. P. Thomas, president United States Steel Products Co., scheduled to preside at the luncheon, was unable to attend because of the current meeting of the American Iron and Steel Institute. At the conclusion of the address by Mr. Barnes, O. K. Davis, secretary of the National Foreign Trade Council, announced the next convention of the council would be held at the Copley-Plaza Hotel, Boston, June 4 to 6.

The dinner, which closed the convention, was addressed by Senator Paul Du Puy, who spoke on "Europe from a Publisher's Viewpoint;" John W. Doty, who described his experiences in the Japanese earthquake; and Colonel William N. Haskell, whose subject was "The Truth About Russia."

The following officers were elected for 1924: President, W. W. Nichols, president Allis-Chalmers Mfg. Co., New York; vice-president, George R. Meyercord, president Meyercord Co., Chicago; and directors, E. P. Thomas, president United States Steel Products Co., E. H. Huxley, president United States Rubber Export Co., New York, Curt G. Pfeiffer, vice-president George Borgefeldt & Co., New York; G. Arthur Schieren, vice-president Charles A. Schieren & Co., New York, Thomas J. Watson, president Computing-Tabulating-Recording Co., New York, W. M. Sloan, treasurer McElroy Sloan Shoe Co., St. Louis, J. L. Kindelberger, president Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich., and D. E. Delgado, export manager Eastman Kodak Co., Rochester, N. Y. Maurice B. Dean is permanent secretary of the association.

PERSONAL

Charles P. Tolman has resigned as chief engineer and chairman of the manufacturing committee, National Lead Co., which position he held during the past 16 years, to establish a general consulting practice, specializing in dust and fume control and handling materials. He will continue as consulting engineer for the National Lead Co., and has offices at 111 Broadway, New York.

E. C. Morse has joined the Triumph Electric Co. and the Triumph Ice Machine Co., Cincinnati, as vice-president in charge of sales and member of the board of directors.

W. W. Phillips, who for the past 12 years has represented the Colonial Steel Co., Pittsburgh, in Rochester, N. Y., has been made sales manager in charge of the New York office, at 149 Varick Street, succeeding H. C. Poole, who recently was promoted to general works manager.

G. K. Atkinson, formerly with the Langhaar Ball Bearing Co., Aurora, Ind., is now connected with the New Britain Machine Co., New Britain, Conn., in the capacity of sales representative for Ohio. His headquarters will be in Cleveland.

James R. Miller, an attorney, has been elected director of the Superior Steel Corporation, Pittsburgh, succeeding H. F. Hansell, who resigned Sept. 20. Mr. Miller is also a director of the Standard Plate Glass Co., Creighton, Pa.

George E. Huntoon, formerly purchasing agent Moline Plow Co., has been elected treasurer of the Tri-City Malleable Castings Co., which recently opened a foundry at East Moline, Ill. He will also act in the capacity of purchasing agent.

John Wheeldon, general manager of plants, Wickwire-Spencer Steel Corporation, has been granted a leave of absence until Jan. 1. Charles K. Hardy, general sales manager, assisted by Winthrop G. Hall, assistant to general manager, will assume Mr. Wheeldon's duties during his absence.

David Fergusson, for more than 20 years chief engineer of the Pierce Arrow Motor Car Co., Buffalo, has joined the staff of James Cunningham, Son & Co., Rochester, N. Y., as chief engineer.

J. A. Cecce has been appointed assistant to manager of purchases of the American Short Line Railroad Association, Chicago.

Edmund C. Mayo, president and general manager American Tube & Stamping Co., Bridgeport, Conn., who for the past four years has been chief executive of the company, has resigned. He has been elected vice-president in charge of all plants of the Gorham Mfg. Co., Providence, R. I., and will assume his new duties on Jan. 1.

J. Edward Thebaud has been appointed Philadelphia representative of the Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y., with an office at 1619 Real Estate Trust Building.

Clinton S. Bradley, resident manager of the Buffalo branch office of the Jones & Laughlin Steel Corporation, has been appointed manager of the hot-rolled material department, with headquarters at Pittsburgh. Mr. Bradley has been with the company since 1901, and was in charge of the Buffalo offices for 16 years.

R. C. Hutchings, formerly with the American Steel & Wire Co., has become associated with the Standard Horse Nail Co., New Brighton, Pa., as assistant to the president.

C. A. Dunn, formerly sales manager of the Weldless Tube Co., has been appointed manager of the Delaware Seamless Tube Co., Auburn, Pa.

J. F. Newman, for 12 years purchasing agent of the Weirton Steel Co., Weirton, W. Va., has become president of the Lawrenceville Bronze Co., Pittsburgh.

OBITUARY

CHARLES PROTEUS STEINMETZ, world renowned mathematician and electrical inventor of the General Electric Co., died of heart failure at his home in Schenectady on Oct. 26. He was born in the old city of Breslau in Silesia, in 1865. From the first his love for mathematics and science asserted itself and to the thorough training received at the Universities of Breslau and Berlin, the great scientist often attributed a large share in later achievements. Forced to flee his country to escape persecution for socialistic affiliations, he went to Switzerland penniless, but made his way into the polytechnic school at Zurich, where he studied engineering. In 1889 he came to the United States and gained employment with a company later acquired by the General Electric Co., which made him chief consulting engineer in 1893. In this capacity he spent the rest of his life, developing the most important of his inventions.

HORACE G. REYNOLDS, president Reynolds Wire Co., Dixon, Ill., died at his home in that city on Oct. 21.

WILLIAM P. CLARK, president Clark Tool Works, Inc., Belmont, N. Y., died at his home there on Oct. 22, following protracted illness. He was born at Unadilla Forks, N. Y., in 1851 and in 1877 was sent to Belmont to take charge of the D. Rawson Works, later A. W. Miner & Co., agricultural implements, as manager. At the time of his death, Mr. Clark was vice-president of the Clark Brothers Co., Olean, N. Y., maker of saw mill equipment. In 1917 he organized the Clark Tool Works, Inc.

WILLIAM J. LLOYD, general superintendent General Electric Co., West Lynn, Mass., works, died suddenly on Oct. 28, in an automobile as he was entering the Tedesco Club, Lynn, Mass., grounds. He was born in Philadelphia in 1866, was graduated from Lehigh University in 1883, from which he also received the degree of mechanical engineer, and then entered the employ of the Westinghouse Electric & Mfg. Co. He became associated with the General Electric Co. about 25 years ago.

E. E. STRONG, president of the Strong, Carlisle & Hammond Co., Cleveland, and first president of the National Supply and Machinery Dealers' Association, died Oct. 29. Mr. Strong had for many years been identified with the machine tool industry. His son, Herbert W. Strong, is one of his successors in the National Supply and Machinery Dealers' Association.

W. CHAPMAN BROWN, superintendent wire weaving department, Cheney Bigelow Wire Works, died at his home in Springfield, Mass., on Oct. 26, in his fifty-fifth year.

FRANK F. AMSDEM, general manager of the Lochiel furnace at Harrisburg, Pa., died Sunday, Oct. 28, following a week's illness. He was about 61 years old, and had had a long career in iron making. He was for many years with the Central Iron & Steel Co. and later wtih Joseph E. Thropp.

The General Electric Co., Schenectady, N. Y., has perfected plans for a merger with the Canadian General Electric Co., with plants at Toronto and Peterboro, Ont., which heretofore has operated under an agreement to manufacture equipment of the first noted company in Canada. The acquisition includes the Canadian Allis-Chalmers Co., manufacturer of electrical equipment, with works at Toronto, Bridgeburg, Stratford and Montreal. Expansion will be carried out at the different plants by the American organization.

Progress Made in Gear Standardization

(*Continued from page* 1183)

to establish a suitable method for inspecting shaper and rotary gear cutters, but as yet is not in position to offer recommendations. It was indicated, however, that possibly the most accurate method would be by the use of a lantern in conjunction with a set of master curves established for 1 D. P., then by moving the lantern to compare other pitches. It was stated in the progress report that if this method proves practical cooperation of those member companies manufacturing these cutters should be had. Nothing has been done this year in the line of raw material inspection. Illuminating discussion of the subject of inspection generally was given by Major Earle Buckingham, Pratt & Whitney Co., Hartford, who, among other axioms, pointed out that the accuracy to which we can work depends upon the amount to which we can measure.

New Table of Keyway Sizes

A new table of practical sizes of keyways, keystocks and tolerances was submitted by Lars G. Nilson, Nilson-Miller Co., Hoboken, N. J., chairman of the keyway committee, which, since its last report, has been working with the committees of other societies and has had extensive correspondence with the association's membership. The new table has only 18 sizes of keyways, from ¼ to 13 in., the 4½, 5½, 9 and 11-in. nominal sizes having been eliminated. The number of keyways, dimension and range of same from 7/16 to 6-in. holes or shafts are identical with the final report of a committee of the A. S. M. E. The association's committee believes that there should be only one standard for square or flat keys for any size shaft, the majority of opinions seeming to be, according to the report, square for small and rectangular for large sizes. In rectangular keys the aim has been to make the thickness as near two-thirds of the width as is practicable. Discussion centered around tolerances, several members objecting to those given in the table. There was discussion also as to the diameter at which the change should be made from square to rectangular. Questionnaires are to be submitted to membership on the points discussed.

Specifications for Steel Castings

In the progress report of the metallurgical committee, headed by C. B. Hamilton, Jr., Hamilton Gear & Machine Co., Toronto, it was suggested that the specifications submitted for steel castings be used by members and that the reaction of the foundries be reported at the next meeting. General accord with the A. S. T. M. was expressed, but it was stated that their general specification does not give all that the committee wants, and it is turning to railroad specifications, section 7 of the A 27-21, which calls for steels of the same per cent of impurities as the class B, but differs in carbon specified. Carbon of 0.15-0.25 per cent was suggested for case hardened castings and 0.30 to 0.40 per cent carbon for untreated and water quenched castings. Manganese content is 0.30-0.60 per cent; silicon, 0.25 per cent on all; phosphorus, maximum 0.06 per cent on acid open-hearth and 0.05 per cent on basic open hearth. Sulphur is limited to 0.06 per cent. Water quenching was given as the reason for advocating not over 100 as the combined value of maximum carbon and maximum manganese.

A questionnaire relating to machinability will be submitted to the membership. It is planned to report on the upper and lower limits of hardness for good machinability. A discussion was started as to whether carbon content makes any difference in machinability, given the same hardness.

The publishing by the association of a handbook on gearing containing all gear data and formulae and other related matter was taken up in the report of the library committee, of which E. J. Noble, Horsburgh & Scott Co., Cleveland, is chairman. This committee is to prepare the handbook, which it is expected will not only serve the members of the association, but be in demand among users of gears, where it will prove a potent influence making for the adoption and use of all of the association's standards. It was suggested that the volume be in the form of a loose leaf book similar to that of the S. A. E. handbook. The report stimulated interest and discussion and was voted approved.

Compensating for Errors in Milled Gears

A paper on the "Analysis of Milled Gears," by Ernest Wildhaber, consulting engineer, New York, and Earle Buckingham, Pratt & Whitney Co., Hartford, read by Mr. Buckingham at the first general session, was received with interest. The following quotations from the paper will serve to indicate its scope.

"One of the most widely used methods of machining gear teeth is to mill them with a formed milling cutter, this method employing a series of eight cutters which are adapted to produce gears with from 12 teeth to a rack, each cutter being utilized to produce a certain part of the series.

"In principle each cutter is correct for the smallest gear in its particular series. The extent of the series for which each cutter is used depends upon the change in the theoretical form. As these forms change least with greater numbers of teeth, the range of cutters greatly increases as the tooth numbers increase. Theoretically, a cutter which is correct for a certain number of teeth is incorrect for any other number; practically, however, this error is slight. One purpose of this paper is to analyze the nature and amount of such errors.

"Furthermore, it often happens that a gear wtih 23 teeth, for example, is required while the only cutter available is the No. 4 cutter instead of the No. 5 cutter. Another purpose of this paper is to show how this cutter can be used with as good or better results by slightly modifying the depth of cut.

"Again, it is often desirable to provide more backlash on the gears than is present when the gears are cut to the theoretical depth. This is accomplished by sinking the cutters deeper into the blank. Theoretically this displaces the profile and alters the action. Another object of this paper is to determine the amount of excess depth for each gear that will give the best results.

"A study of the errors introduced as noted above will show that they can be reduced and compared to the errors in eccentric gears."

In addition to the determination of errors, the analysis also provides remedies. It develops a distribution of backlash which avoids errors ordinarily incurred through cutting deeper. It shows how the contact may be prevented from shifting too much, either toward the bottom or to the tips of the teeth. It permits the use of compensating cutters, by making one error modify another.

It was emphasized that one of the general and important gear problems is how to avoid safely edge contact at the beginning of mesh. The tip edge of the driven tooth is particularly dangerous to have contact with the flank of the driving tooth. When this danger exists in milled gears, for instance with low tooth numbers, through lack of accuracy in cutting, it may always be avoided by cutting the driven gear a trifle deeper.

Interest Shown in Industrial Relations

The response to a proposed program, outlined by E. S. Sawtelle, Tool Steel Gear & Pinion Co., Cincinnati, chairman of the industrial relations committee, showed considerable interest on the part of the membership in the general subject. Allied to this, and in which much interest was also shown, was an address by John Kottcamp, head of the department of industrial engineering, Pratt Institute, Brooklyn, N. Y., on the "Training of Shop Executives."

The remarks of Mr. Sawtelle were in the nature of personal ideas as to the possible activities of his committee, which had been reorganized recently and had no report to make. He emphasized the probable success of a company having high grade management as compared to large financial resources alone, and pointed out the necessity of sympathetic alert cooperation from each employee, the achievement of which was indicated as solving to a large degree the problem of personnel. Ways and means to accomplish this was,

he said, the primary function of any industrial relations committee.

The practical value of wage questionnaires was evidently questionable to the speaker, who thought that the matter of wages was a local problem, fixed by living conditions in each location and conditions in each shop. The cost of labor turnover was emphasized and helping employees think right, and the prevention of radicalism was discussed, as were also the value of stock ownership, profit sharing through wage incentives or actual sharing of profits. It was stated as his opinion that time can be spent profitably in making a comparative study of reports on the various wage incentives, their benefits and how they can be applied. Suggestions and experience on the training of workmen and foremen were thought to be of value, and also suggestions on managerial contact with men and welfare work. A proposal to study the progress of companies notable for success along personnel lines was offered. Mr. Sawtelle reiterated, however, that no two personalities are the same, no two shops are the same, and that industrial relationship is 99 per cent a matter of applied personality. Hence, the whole question is one that each man must solve for himself, he said.

Necessity for the careful selection of raw material for the training and development of successsful shop executives was strongly emphasized in Mr. Kottcamp's address on "Training Shop Executives."

Personnel organizations and systems of training executives, adopted by many companies were referred to. In this connection, Mr. Kottcamp said, "To my mind, industry will profit most by selecting from its shop young men who fill the specifications for good raw material. Give these men leave of absence and send them to a technical school giving a short and intensive training. Follow the progress of these men, keep in contact with the school and upon completion of their courses, take them back into their former positions." Giving the men greater responsibility as fast as they merit it and not killing their initiative by exploiting them on a job they can do well, were emphasized.

Cost Committee Active

An outline of the best method for overhead cost distribution in the gear industry was incorporated in a paper by O. C. Kiehne of the Van Dorn & Dutton Co., Cleveland, which was passed to members at the meeting. An equitable and accurate method whereby these expenses may be allocated to cost was emphasized as one of the greater problems in cost finding. The methods of percentage on material, percentage on labor cost, and percentage on the man hours were discussed, and a method of applying the machine rate given. The committee on uniform cost accounting, of which J. H. Dunn, R. D. Nuttall Co., Pittsburgh, is chairman, has been increased to ten members. It is planned to distribute during the year a series of papers similar to that of Mr. Kiehne's, and investigation will be made as to the success of the uniform cost work done by other associations.

A plea for the organized activity of the society in the bigger and broader problems affecting the gear and other industries, in addition to the standardization and other technical work of the society was made by S. L. Nicholson, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in the report of the tariff committee of which he is the chairman. The effect of the tariff, taxation and the policy of the Government in other matters affecting industry was vividly described in its vital bearing on the gear industry, and the creating of a committee to work in this broad field was advocated. It was proposed by Mr. Nicholson that the tariff committee be dropped, but discussion on this point left the matter in the hands of the executive committee which will take under consideration changing the name of that committee.

Discusses Expansion Possibilities of the Gear Business

RESEARCH with a view to ascertaining new uses to which gears may be put was urged by E. W. Miller, Fellows Gear Shaper Co., Springfield, Vt., in an address on the "Development of the Gear Industry," at the last session. Several unusual applications of gears were shown by lantern slides and the design and function of these applications explained in detail.

"The work done has impressed upon me," said Mr. Miller, "that the gear business is far from the much touted saturation point. It is apparent, too, that our endeavors should not be confined to standardization work and to human relationship problems, as great and necessary as this work is. We should fare forth as explorers and promoters of the gear industry, remembering that perseverance wins." Keeping posted as to the development of new devices or machines and offering service as gear engineers in connection with the new developments was urged. "It is indeed uncommon," said Mr. Miller, "to find in a mechanical institution a department whose work is business research engineering. The function of such a department would be not only to explore the present gear field, but to ascertain accurately to what new uses gears may be put, thus bringing out potential possibilities."

Among possibilities cited as at present largely unconsidered were the substitution of cut gears for those now having the teeth cast or punched. "In these cases," he said, "not only will the cut gear be a great improvement with respect to quietness and smoothness of operation, but it can be demonstrated that many times the manufacturer can produce them more cheaply than otherwise. Expense of assembly and hand work on the teeth may far exceed cutting costs. Thousands of toothed wheels are being made today which cannot receive our stamp of approval as gear engineers. History is behind these tooth designs. It is usually found that some mechanical genius has worked out a device experimentally. Cut and try methods have resulted in notched wheels which cause the mechanism to work satisfactorily. A market has been developed and the gear teeth are patterned after those in the experimental machine. Special machinery is designed for the production of these gears and they are made in great quantities. Analysis makes plain that these primitive gear tooth shapes are expensive members. The lack of gear knowledge on the part of the designer results in a useless waste of money. The tooth design is such that production cannot keep pace with the development of gear cutters and gear cutting machinery. A change is usually unthinkable, because of difficulty in furnishing repair parts.

"Here is plainly our opportunity. We should go to the full limit of our resources to get in touch with new design work and then offer our best engineering advice."

Several possible new uses of gear teeth were mentioned. "The future may show," he said, "the value of gear teeth for power transmission, when little or no notion occurs between engaging teeth. Gear teeth may become prominent as the chief actors in a liquid measuring device, actually doing the measuring while other teeth in common fashion effect the rotation of the mechanism.

"Gear teeth may occupy an important place in the refrigerating industry. As compressors they may take their place in the multitude of large or small chemical refrigerators which will be in use within a few years. Gear teeth in addition to being transmitters of power may be part of the prime mover. The air turbine whose rotor carries gear teeth may become widely used. Gear teeth may be used uniquely as a positive face clutch."

Other Addresses

"Simplified Practice As a Service to American Industry" was an address by R. M. Hudson, division of simplified practice, Department of Commerce.

S. L. Nicholson, Westinghouse Electric & Mfg. Co., East Pittsburgh, told of his recent trip to New Zealand, Australia and India, outlining the railroad, industrial, labor and general business situation in those countries. Opportunity for American trade in India, in machinery and other commodities was pointed out.

Metal Working Production Problems

(*Continued from page* 1181)

shall make the machine, to all intents and purposes, a special machine for the particular operations and product desired. This tooling likewise demands judgment and wider experience, but it is capable of much more rapid development than the machine itself, and unlike the machine, may be altered from day to day in its approach toward perfection with a corresponding daily improvement in production.

It is one of the standard grievances of the machine builder that this special tool design is so often left to him, when it could best be done in the shops of the user. As between two men of the same ability and experience, the one working where the tools are to be used has the advantage. Working conditions, methods of inspection, condition of forgings, all affect the ultimate tool design in ways which it is difficult for the absentee engineer to take account of. It is true, of course, that the tool designer on the staffs of the machine builder has the advantage of being a specialist in that machine, but that is his only point of advantage. If the user will concentrate on a small variety of standard machines his tool engineer may become a specialist also, instead of spreading his activities over a hundred sizes, types and designs.

Advantages of Standardized Machine-Tool

The advantages thus far urged for the standardized machine tool are: Perfected design, better machine for the money, and this last point of permitting the tool engineer to specialize and thus do better work.

The fewer kinds of machine needed, with standardization, bring also the following benefits:

1. Greater familiarity of staff with upkeep and adjustments.
2. Fewer repair parts to carry in stock.
3. Greater flexibility in shop layout and in assignment of work.
4. Less expense in changing design of product.

From the standpoint of employees are the following advantages:

1. Fewer kinds of operators to train for repairs, adjustments and for machine operation.
2. A man once trained can be used on a greater percentage of the machines in the shop.
3. Training can be standardized and men taught more easily. This affects the cost of labor turnover.

Some of these advantages affect the direct labor cost. Others affect the overhead. The wise manager is giving particular attention to the latter division of the cost of manufacture, for of the three primary elements in cost—labor, material and overhead—it is the overhead which is the most susceptible of improvement; and it is this same element which is most favorably affected by the standardization of a few types of machine tool equipment.

In connection with his paper, Mr. Flanders pointed out some of the features and illustrated with lantern slides some of the production machines made by his company, including single and double spindle turret lathes and automatic lathes of various types equipped with special attachments and tool equipment for different operations in production work and calculated to eliminate the necessity of using special machinery.

Discussion of this paper hinged around practical details of the operation of the flat turret lathe and the Fay automatic lathe. In reply to a question, Mr. Flanders stated that in many cases the time of an operator giving his entire attention to one of the automatic lathes did not result in other than a very reasonable labor charge. He cited one instance in which a completely turned aluminum piston was produced every 17 sec., in which he averred that the time of two men, if required, would not be an excessive charge when prorated over the total output.

Economics of a Special Purpose Machine

E. P. Blanchard, Bullard Machine Tool Co., presented a paper on the "Fundamental Principles in Modern Production Machines" in which he dwelt on the design and operation in the Bullard Multaumatic and Continumatic special purpose machines for large production work. In reply to questions he said that from 200 to 300 parts would be the minimum quantity of production that would be worth while to set the machine up for and that it would pay the manufacturer to install a Multaumatic even if it is used only two months in the year.

The practical nature of the program of the Friday morning general session drew a considerable representation from the shop organizations of the Cleveland district. A suggestion for future meetings was made by R. E. Flanders, who advocated the idea of making comparative studies of several different methods for the production of a specific operation or group of operations on a given part.

Standard Machine Tool Specification Sheet

A brief outline of a new form of standard machine tool specification sheet was presented by A. L. Evans, who stated that this form had been favorably received at the recent convention of the National Association of Machine Tool Builders and is to be perfected at a committee meeting in the near future. This form covers the general characteristics of the machine as to size, weight, floor space and drive requirements. In addition to these features, space is arranged for the inclusion of time study tables, feed and speed characteristics and specific tool and fixture mounting dimensions. A line drawing in the scale of ¼ in. per ft. is included for assistance in the preparation of the usual factory layout.

Developments in Grinding

A. J. Ott and C. L. Ott, president and secretary-treasurer, respectively, of the American Grinder Co., Detroit, presented a paper on spur gear grinding and testing which was devoted largely to a description of a new gear grinder and a gear tester made by their company. The authors called attention to the rapid progress that has been made in the art of grinding during the past 20 years. Manufacturers of grinding machines formerly urged that for plain cylindrical grinding work the parts first be rough turned in lathes and then finished on the grinder to the limits required to make them interchangeable. Automotive engineers and manufacturers had grasped the idea of grinding and its advantages and today no one would think of turning cylindrical parts that are to be hardened, nor would they harden a part after finishing it to size.

The authors stated that by using the machine and methods described by them fine finishing cuts and burnishing and polishing operations can be eliminated in the production of spur gears. Economy in making transmission gears is obtained by roughing out the teeth to about 0.005-in. oversize tooth thickness, depending on the amount of backlash desired, then hardening the gear, grinding the hole or stem, and finally the teeth. A great deal of time should not be spent on finishing operations and the gears then subjected to heat treatment, for some distortion is sure to occur. The finishing can be done best by grinding after hardening and it can be done in the same or even less time.

In reply to questions Mr. Ott said that the additional cost of grinding automobile transmissions is approximately 10c. a gear or 50c. to $1 a transmission, depending upon the number of gears. Ground gears have three advantages, economy, durability and the elimination of noise. He said that two of the leading Detroit automobile companies had made comparisons of the wear of gear teeth ground and not ground and had found that the ground teeth last much longer.

"Developments in Production Grinding in the Automotive Industry" was discussed by Oscar A. Knight, Detroit district manager of the Norton Co. He stated that in production grinding the progress made during the past few years has been along the line of grinding simultaneously multiple parts such as piston rings and ball and roller bearing cups. This kind of grinding brought out the use of wider wheels. With the development of these operations came the cylindrical grinding of square and distributor cams, square shafts, piston relief grinding and double wheel grinding of such

parts as steering knuckles and pinion shafts. To perform these new operations more care has been taken to build machines that are heavy, strong and more accurate. New machines and special attachments have been put into use. Cams formerly were ground individually but with the integral cam grinding attachment the whole cam shaft, having 12 individual cams integral with it, is ground in about the same time as one individual cam by the old method. By means of attachments reliefs are now ground in pistons at the rate of 125 to 175 pistons per hour. The square end of a transmission shaft 1 in. sq. by 3 in. long can be ground at the rate of 65 pieces per hour or a 90 per cent increase in production.

The speaker attributed the principal development in production grinders to the use of wide face grinding wheels. With present types of machines, ends of rear axle shafts are ground at the rate of 100 to 125 per hour as compared with 12 per hour under old methods. During the past year a wheel spindle reciprocating attachment has been developed as well as flat table machines with swivel tables as well as various attachments. A forming device has been brought out to form the wheel for grinding the entire surface including tapers and straight portions. This machine in cases has increased production from 100 to 400 per cent. In ball and roller bearing work special arbors have been made for holding as many rings as can be covered by a wheel up to 10 in. wide and by this method production has increased 100 to 400 per cent. At present the demand of the automobile companies is tending toward grinding machines having self-contained drives and controls. Some of these types were shown in the illustrations.

The new type of heavier machines are equipped with new mechanism for driving the wheel, the wheel spindle being belt driven from the power shaft. In some of the new machines chain drive has been substituted for gears and in grinding crank shafts with this type there have been no complaints of chatter marks. In the discussion Mr. Knight said that there is a tendency toward automatic, semi-automatic and centerless grinding machines.

Economies of Factory Conveyor Systems

"The Application of Conveyor Equipment to a Small Production Plant" was discussed by H. P. Harrison, master mechanic H. H. Franklin Mfg. Co., Syracuse, N. Y. The speaker said that it is first necessary to determine whether a plant has a production large enough to make a conveyor installation advisable, and to consider the question of possible plant rearrangement for routing the work on conveyors. He believed no plant making automobile parts is too small to consider the installation of some conveyor equipment as an aid in reducing costs. However, how far the installation of conveyors should be carried can be determined only by a study of each individual case.

The speaker referred to the problems in the Franklin plant, where conveyors have been installed, for an elastic production schedule of 20 to 60 cars per day. In this system a power driven unit was installed for conveying machine parts and assembly parts between the various machines on which the operations were performed. However, power driven conveyors did not prove satisfactory for this particular work and conveyors of the gravity type have been substituted. In the speaker's opinion, in the average plant of small production it is not practical to use power driven conveyors where the operations are performed directly on the conveyor line.

Mr. Harrison discussed at length with illustrations the complete conveyor system in the Franklin plant, starting with an automatic elevator that carries the cylinder castings from the basement to the cylinder machining department on the third floor. At first an endless belt conveyed the cylinders between the various machining operations but this proved unsatisfactory and was replaced by a double line gravity conveyor which has given good results. With the use of conveyors the company reduced the number of cylinder castings in process by 2000. By the use of a power driven chain conveyor for transmissions, resembling a long bench, the company was able to produce its maximum schedule with 50 fewer transmissions in process and with an 18 per cent reduction in labor costs.

The plant has one power driven conveyor where the only function is moving work between machining operations, this being used for handling axle parts, but the speaker believed a gravity conveyor would serve this purpose just as well if not better. In the axle department a double chain type conveyor is used for assembling the various parts and another for the final assembly of rear axles, both of these being extremely heavy to withstand heavy pounding. By concentrating the manufacturing of axle parts and finished axles into one unit a large amount of handling of bulky finished parts was eliminated and there is not the danger of the shortage of some part coming from another section of the plant, as all the axle parts are made in one room.

The speaker stated that the number of axles in process has been reduced by about 500 and the actual manufacturing cost of axles has been reduced 15 per cent and he declared that the operation of the conveyor leaves no doubt as to the practicability of the unit system of manufacturing for a large portion of the parts produced in plants of capacity similar to that of the Franklin. He added that one of the most interesting installations recently made is a conveyor for handling the trimming of open bodies and at present an extensive installation is being made for handling the finished car through the final inspection and touch-up operations.

Human Element Touched On

"The Human Element in Production" was the subject of a paper by W. F. Jameson, chief inspector Cleveland Automobile Co. He urged the development of concentration on the part of employees by inspiring them with an interest in their work and thereby improving production. The speaker contended that employers have overlooked the possibilities of training the mind behind the man, thinking of the workmen as so many hired hands. Wonderful results have been accomplished from a production standpoint, but he asked if greater results cannot be obtained by cultivating more than the machine side of the man. The majority of workmen are capable of thinking and should be coached to think rightly. A man who takes an interest in his job and applies himself to it will turn out better and be of more worth. Plenty of men take an interest in their work when they apply themselves to it but the difficulty lies in getting them to apply themselves consistently.

Of all incentives, he said, the most productive is the feeling that one is working for himself. It is easy to convince men of the above principles but to keep them "sold" requires repeated efforts on the part of the foreman. He held that the spirit that he is working for himself can be injected into a workman by making him feel that every job can be made a training school of experience and that the factory is an educational institution where important problems are to be solved and where great opportunities are offered for advancement.

Group Piecework Wage Payments

A paper on "Wage Incentive Systems" by Eugene Bouton, supervisor of time study, Chandler Motor Car Co., proved of deep interest and brought out a large number of questions. Mr. Bouton said that practically all managers of modern plants favor some wage incentive plan but there is considerable difference of opinion as to what is the proper system to install. Some of the systems are highly complicated and involve a large amount of clerical work and the employer does not know in advance what the direct labor cost will be nor does the employee know what his earnings will amount to until they are compiled at the end of a pay period.

The speaker described in detail a system placed in operation six months ago by the Chandler company. This is a group piecework plan for the major assembly units and machine departments and straight individual piecework for small parts on which the operations do not lend themselves very readily to group piecework. The piecework prices are established from time study. The group piecework plan, is fundamentally the same as straight piecework. A time study of all the opera-

tions of the group is taken and a price is set on the additive time. In other words all operations to produce the unit are combined in one operation. The group earnings are derived from the number of accepted finished units multiplied by the unit price. The individual workman's earnings are prorated out of group earnings based on his hourly rate and the number of hours worked. The total group piece earnings divided by the total day rate earnings of the group equals the factor by which is multiplied the workman's day-rate earnings, which gives the prorated piecework amount.

Mr. Bouton pointed out that one important factor of the successful operation of the group plan is the differentiation of hourly rates. Careful judgment should be exercised in rating men according to their ability and the skill required for their respective work. Unskilled workmen and new employees should receive the minimum hourly rate and semi-skilled and skilled men should be properly rated above the minimum rate. Maximum and minimum hourly rates are specified and all rates established must be within the two limits. A man granted an increase in his hourly rate receives a higher prorated share of the total group earnings.

Another feature of the group piecework plan is the immediate determination by the foreman of the number of men required to produce any given schedule of units. If it requires 100 men to make 100 units per day and the schedule should drop to 75 it would require practically 75 men to produce 75 units. The group or cost price of each unit should be based on as near a uniform schedule as it is possible to set but any wide variation in production would tend to change the original rate and would necessitate a slight change in the piecework prices in the unit.

When a new employee is added to the group he can be allowed to work two days before participating in group earnings; then he is prorated among the group. Should he be unsatisfactory to the rest of the group or too slow he is taken out. The employees desire to earn as much as possible and it is to their interest to keep the number of men in a group down to a minimum. The spirit of teamwork is developed and inefficient workers are eliminated.

An inspector's coupon shows the number of units completed daily in each group, rejections, etc., and from this the timekeeper makes up a group piecework report and from the latter report the foreman knows by 10 a. m. what each man's earnings were for the previous day. This feature is favored by the employees, some of whom had worked in group systems in other plants where they could not learn what their earnings were until the next pay period.

Referring to the proper size of a group, Mr. Bouton said that his company had found that a group should be limited to the unit itself and that there should not be more than one group in any one unit. The company has one group of 92 men and some as low as 3 men. There are no bonus or premium calculations and with a flat price on any group the management knows at all times the direct labor cost. The speaker pointed out that the system lacks complications and that there is a definite understanding with the man as to the amount of work to be produced for the compensation received. Both the company and employees are satisfied that the system has met all principal objections made to other wage incentive systems.

The following additional facts regarding the system were brought out in questions submitted to Mr. Bouton.

The group plan has had the effect of greatly reducing the labor turnover and attendance has become much better. Men can soon learn to gage their earnings by the production each day but the foreman can always tell them their actual earnings on the following day. The scrap allowance depends on the nature of the work. Only labor is deducted from parts scrapped in the group plan operations, the men not being charged for the loss of material. While the employee is guaranteed only the minimum rate, he must earn considerable more to be efficient enough to stay on the job. The incentive to do good work under the group plan has resulted in some decrease in the inspection work.

About 90 per cent of the work in the plant is on piece rates. In the machine departments the group plan employees make 15 to 25 per cent above a day rate. If the pay of one member of a group is increased, that of others in the same group is slightly decreased. If an employee is penalized for being late, the amount he is penalized is given to the remainder of the group instead of going to the company. Speed men are not employed to speed up work in a group. The tool department is operated on a day work basis. If members in a group object to one of their number, they take the matter up with the foreman; and if there is a justification for their complaint, the man is removed from the unit. Individual effort is found to be practically the same in large as small groups.

The guaranteed hour rates in the group plan are lower than the straight day work rates. Assembly work and many machine operations lend themselves to group work. When there are only one or two operations day rates seem to work out best. One of the questions suggested that under the group plan there might be a tendency for a group to make unreasonable wage demands and possibly quit work in a body should these demands not be granted, but Mr. Bouton said that his plant had experienced no trouble of this kind.

Percy S. Brown, works manager of the Corona Typewriter Co., presented a comprehensive paper covering every detail of the production control methods at the Corona plant from the time an order comes from the sales department until the order is shipped. Starting with scheduling he discussed the work of the method division, of the instruction card division which sets standards for piecework operation, of the route division which keeps the assembly department supplied with parts, of the stores division which issues requisitions on the purchasing department and of the department handling interplant transportation. The speaker showed various forms used in the organization system and made clear how the methods outlined could be applied to automotive plants.

Testing and Inspection Instruments

Standardization of methods of applying the scleroscope was discussed by Albert F. Shore, of the Shore Instrument & Mfg. Co. This dwelt largely on suggestions made by the iron and steel division of the S. A. E. Standards Committee with the view of increasing the accuracy of readings made by the scleroscope in testing for hardness. Among his conclusions were the following: The scleroscope should be set within 1 deg. of plumbness. An error of 0.007 is introduced for each degree up to 5 deg. when the instrument is out of plumb. Inclination at a 10 deg. angle introduces a drop of 8 per cent in readings. A too rough surface on test specimens causes fluctuation in readings. Scale on soft steel influences readings but slightly. When the steel is hard it can be tested through the scale by making allowance. Variations in the shape and dimensions of the test piece have some effect upon the readings.

A. H. Frauenthal, Chandler Motor Car Co., discussed factors governing out-of-roundness measurement. The author pointed out that in order to properly check the out-of-roundness of parts whose contour has an even number of high spots a checking instrument with two opposing measuring points must be used and for parts whose contour has an uneven number of high spots a checking device with three point contact, one point being located on the central line between the other two. For close work with the three point method the angles between the three points of contact must be selected according to the number of high spots. The author expressed the opinion that there is still considerable room for improvement in instruments in checking out-of-roundness and suggested to manufacturers the inclusion of these three features for instruments for this purpose; a flat measuring point large enough to reach the major diameter when it is off centered with the measuring point due to ellipticity; rotation of the measuring point to promote even wear, and a corrected indicator for use with a 90 deg. angle V-block thus eliminating correction by the operator.

Machinery Markets and News of the Works

RENEWED RAIL ACTIVITY

Several Roads Inquiring for or Buying Machine Tools

Baltimore & Ohio, Norfolk & Western and Rock Island Issue Lists—Burlington Purchasing

Apart from railroad purchases and inquiries, the machine-tool markets are extremely quiet. The Baltimore & Ohio, Norfolk & Western and Rock Island Lines have issued inquiries for 10 or more tools each. Tentative orders have been placed by the Burlington on a list issued some time ago. There is also a good deal of miscellaneous railroad buying.

The Baltimore & Ohio list asks for prices on 10 engine lathes and a number of other tools; the Norfolk & Western inquires for about 15 machines, including three radial drills, five engine lathes, three boring mills, two milling machines and other tools.

While formal orders have not been issued by the Burlington, tentative awards have been made of the tools it inquired for months ago.

Further railroad inquiry and buying is expected before the close of the year.

There has been a severe let-down in buying of tools by manufacturers, the past week having been as quiet as any time this year. While some manufacturing plants are still working at full time, others are curtailing schedules. Few plants have orders which will insure operation beyond the close of the year, and this lack of future business probably accounts for the general disinclination to purchase new tools at this time. Continued offerings of used tools in good condition at fairly low prices are also prejudicial to the sale of new tools.

More interest is developing in prospective Japanese buying in view of the fact that some orders already have been placed. A Cincinnati manufacturer took an order for 12 engine lathes on which immediate shipment was required. He was able to take the order because of having the machine in stock.

New York

NEW YORK, Oct. 30.

MISCELLANEOUS railroad buying, mostly in small lots, is the chief sustaining influence in the machine-tool market. Purchase of tools by industrial companies is at a very low point and no improvement is looked for until after the first of the year at least. The Southern Wheel Co., St. Louis, has purchased a 48-in., 300-ton wheel press from an Eastern builder. The Oil Well Supply Co., Pittsburgh, has ordered a 2500-ton steam hammer.

The Baltimore & Ohio Railroad is in the market for the following machines:

One 90-in. journal truing lathe.
Two 36-in. upright drills.
One guide bar grinder.
Two driving box boring and facing machines.
One 7-ft. radial drill.
Two 16-in. engine lathes.
One drill grinder.
One 20-in. upright drill.
One 24-in., one 28-in. and one 30-in. shaper.

The Norfolk & Western Railroad has an inquiry out for the following machines:

One 4-in. radial drill.
Two 6-ft. radial drills.
One 26-in. upright drill.
One nut facing machine.
Two 20-in. engine lathes.
One universal cutter and tool grinder.
One 36-in. draw cut shaper.
One link grinder.
Five 16-in. engine lathes.
One No. 2 universal milling machine.
One 60-in. engine lathe.

The General Motors Corporation states that the recent report that a contract for erection of a plant in Japan had been let to the H. K. Ferguson Co., Cleveland, is incorrect. The General Motors Corporation through its foreign subsidiaries is handling the construction of assembling plants in London and Copenhagen, as later announced in THE IRON AGE, but does not at present intend entering Japan.

The George Haiss Mfg. Co., Inc., 142d Street and Canal Place, New York, is in the market for rolls for bending plate up to ¾-in. thickness. Rolls must be 10 to 12 ft. between bearings.

The Viking Tool & Machine Co., Sixty-fifth Street, Brooklyn, has inquiries out for a number of power punch presses, 3 kick presses and a squaring shear, 30-in.

Fire, Oct. 22, destroyed the two-story machine shop at the yards of the New York Central Railroad Co., New York, at 154th and 155th Streets. An official estimate of loss has not been announced. It is planned to rebuild.

Louis Brook, Inc., Woodward Avenue, near Flushing Avenue, Brooklyn, has plans under way for factory addition, 100 x 160 ft., at its lumber and woodworking plant, estimated to cost $200,000, with machinery, the majority of which will be electrically-operated. Edward M. Adelsohn, 1778 Pitkin Avenue, is architect.

The Brambach Piano Co., 639 West Forty-ninth Street, New York, is planning for the installation of a drill press, 20-in., back-geared.

The J. A. Manning Paper Co., George Street, Troy, N. Y., an interest of the Manning Abrasive Co., has preliminary plans for a new one-story plant at Green Island, 40 x 150 ft., to cost $250,000 with machinery. The main portion of the structure will be equipped as a beater department.

The City of New York Bellevue and Allied Hospital, 415 East Twenty-sixth Street, is having plans drawn for a new ice and refrigerating plant, to cost about $60,000. A. Judd is secretary in charge.

C. Brandes, Inc., 237 Lafayette Street, manufacturer of wireless equipment, has leased another floor in the building at address noted, totaling about 5000 sq. ft. of space, for extensions. The company will be occupying four floors in this building, as well as a new factory at Newark, N. J., lately acquired.

The Standard Oil Co. of New York, 26 Broadway, has acquired the Bayles Shipyard of the New York Harbor Dry Dock Corporation at Port Jefferson, L. I., for $100,000, and will use the property as a new shipbuilding and repair works.

The Astoria Light, Heat & Power Corporation, 130 East Fifteenth Street, New York, has plans for additions and improvements in its plants on Winthrop Avenue, Long Island City.

The American Can Co., 120 Broadway, New York, is planning for additions and improvements in its plant at Fairport, N. Y.

In connection with proposed equipment purchases to involve about $2,860,000, the Long Island Railroad Co., Pennsylvania Terminal, New York, has placed an order with the Westinghouse Electric & Mfg. Co., East Pittsburgh, for apparatus to cost about $600,000. Other contracts for electrical and mechanical equipment will be awarded soon.

Manual training equipment will be installed in the two-story high school addition to be erected at Mount Kisco, N. Y., estimated to cost $200,000, for which plans are being prepared by E. Sibley, Bluff Road, Palisades, N. J.

The W. N. Best Corporation, 11 Broadway, New York, manufacturer of oil burners and oil-burning apparatus, has purchased the plant of the American Tube & Bending Co., 316-22 Coit Street, Irvington, N. J., comprising a one-story structure, 100 x 200 ft., for a new works. Equipment will soon be installed. The company is now operating a plant on Gates Avenue, Brooklyn. Col. Joseph D. Sears is president, and Bertram W. Saunders, secretary.

The Crane Market

Activity in electric overhead traveling cranes and locomotive cranes is at a low ebb. Few new inquiries have appeared in the past week and current business, on which action has not yet been taken, with one or two exceptions, is for cranes of small capacity. Cranes on the recently issued list of the General Electric Co., Schenectady, N. Y., for the Philadelphia plant include nine 3-ton, two 5-ton, two 10-ton and one 25-ton overhead cranes. The list of cranes for the New Jersey plant of the Western Electric Co., which will be sent to a previously selected list of bidders, it is announced, will be issued this week. The Public Service Electric Co., Newark, N. J., is about to close on its inquiry for two 125-ton, double trolley overhead cranes. The American Radiator Co. will probably close on a locomotive crane this week. James J. Weiler & Sons, Robson-Prichard Bldg., Huntington, W. Va., is asking for prices on an overhead traveling crane for a new steel fabricating shop.

Among recent purchases are:

Georgia Railway & Power Co., Atlanta, Ga., a 50-ton, 50-ft. span, electric traveling crane from the Whiting Corporation.

Carnegie Steel Co., Pittsburgh, fourteen 1-motor jib cranes from the Whiting Corporation.

Joseph T. Ryerson & Son, Chicago, a 10-ton, 75-ft. span, 5-motor, overhead traveling crane for their Detroit plant from the Milwaukee Electric Crane & Mfg. Co.

Davies Supply Co., Chicago, a 5-ton 55-ft. span, 3-motor overhead traveling crane from the Milwaukee Electric Crane & Mfg. Co.

Carnegie Steel Co., Pittsburgh, an 11-ton, coal hopper crane for the Clairton, Pa., works, from the Alliance Machinery Co.

Stamford Gravel Co., Stamford, Ont., Canada, a 20-ton, 45-ft. boom, 8-wheel, used Brownhoist locomotive crane from Philip T. King, New York.

West Leechburg Steel Co., West Leechburg, Pa., a 5-ton, 47-ft. 6-in. span, electric traveling crane from the Northern Engineering Works.

Virginian Railway Co., Norfolk, Va., two 30-ton, 47-ft. span, 3-motor, overhead traveling cranes from the Bedford Foundry & Machine Co.

Fire, Oct. 21, destroyed the plant of the Raritan Hollow Tile Co., Keasbey, N. J., with loss estimated at $100,000, including machinery. The machine department, power house, mechanical drying house and clay department sustained the bulk of loss. Robert Lyle is general manager.

The Union County Park Commission, 286 North Broad Street, Elizabeth, N. J., has plans for the construction of a machine shop, general repair works and store house on the Elizabeth-Roselle Park property, to cost about $35,000. C. G. Poggi, 275 Morris Avenue, is architect. W. R. Tracy is engineer for the commission.

Lincoln E. Rowley, city clerk, East Orange, N. J., will receive bids until Nov. 13 for one snow loader, Barber-Greene type, as per specifications on file.

A machine shop will be installed in the new two-story and basement psychological laboratory, 35 x 130 ft., to be erected at Princeton University, Princeton, N. J., estimated to cost $125,000, for which a general contract has been let to the Matthews Construction Co., Trenton. Day & Klauder, Franklin Bank Building, Philadelphia, are architects.

Manual training equipment will be installed in the new high school to be erected at Irvington, N. J., estimated to cost $500,000, for which plans are being prepared by Donn Barber, 101 Park Avenue, New York, architect and engineer.

The Passaic Valley Sewerage Commissioners, Chamber of Commerce Building, Newark, N. J., will take bids until Nov. 13 for an electrically-operated pumping plant at the Yantacaw station, Clifton, N. J., consisting of three centrifugal pumping units, each with capacity of 6,500,000 gal. per day; one gasoline engine-driven electric generating set, capacity sufficient to drive pumps, with switchboard, automatic control, etc., as per plans on file. Joseph H. Quigg is clerk.

Philadelphia

PHILADELPHIA, Oct. 29.

A BOND issue of $10,000,000 is being sold by the Philadelphia Electric Co., Tenth and Chestnut Streets, a large part of the proceeds to be used for an expansion program, including additional generating equipment and auxiliary machinery. Joseph B. McCall is president.

The Koelle-Greenwood Motor Co., 6025 Germantown Avenue, Philadelphia, has awarded a general contract to the Turner Construction Co., Presser Building, for the erection of a new two-story and basement service and repair building, 70 x 210 ft., to cost $100,000.

Amos H. Hall & Son, 2915 North Second Street, Philadelphia, manufacturers of tanks, etc., have awarded a general contract to the William Steele & Sons Co., 219 North Broad Street, for a new plant and power house on Erie Avenue, to cost $97,000 with equipment.

The Supply Officer, United States Navy, Philadelphia, will take bids for a quantity of duraluminum rivets, screws, nuts and washers, aero requisition 812; also for two indicating annunciating gages, N.S.A.F. requisition 279; and for one high frequency apparatus, M. and S. requisition 36.

The Packard Motor Car Co., Broad and Wood Streets, Philadelphia, has acquired property on Broad Street, 200 x 265 ft., for about $300,000, as a site for a new five-story service, repair and headquarters, estimated to cost $600,000.

The American Ice Co., 121 North Broad Street, Philadelphia, has awarded a general contract to Sutton & Stephensen, Thirteenth Street and Washington Avenue, for a new three-story ice-manufacturing and cold storage plant, 60 x 150 ft., at South and Seventeenth Streets, to cost approximately $90,000.

Fable & Co., Inc., 837 North Third Street, Philadelphia, manufacturer of sheet metal products, has awarded contract to the George Kessler Contracting Co., 1733 North Marvine Street, for a new plant at 510-12 North Third Street, to cost about $42,000.

A one-story addition will be built to the power plant of the National Biscuit Co., Broad Street and Glenwood Avenue, Philadelphia, in connection with an extension to its baking plant, for which a general contract has been let to John Griffith & Son Co., Twelfth and Glenwood Streets.

Gimbel Brothers, Philadelphia, will erect a one-story automobile service and repair building, 60 x 195 ft., for company cars and trucks, on Ludlow Street

The Philadelphia & Reading Railroad Co., Philadelphia, is taking bids on a general contract for the erection of a new car inspection, cleaning and signal works building at its new terminal, Camden, N. J. Samuel T. Wagner is company architect.

Manual training equipment will be installed in the new three-story and basement high school to be erected at Shamokin, Pa., estimated to cost $175,000. W. H. Lee, 1505 Race Street, Philadelphia, is architect.

The Harrisburg Gas Co., Harrisburg, Pa., has plans for a one-story steam power house to cost $30,000; one-story compressor and blower works to cost $17,000, and one-story addition to the laboratory.

Property of the Harrisburg Foundry & Machine Works, Seventh and Curtin Streets, Harrisburg, Pa., including buildings and machinery, will be offered for sale on Nov. 9 by Christian W. Lynch, receiver. The two 15-ton traveling cranes will be included.

The Harrisburg Cement Block & Construction Co., Harrisburg, Pa., will commence the erection of a one-story plant at 1232-38 South Cameron Street.

Fire, Oct. 22, destroyed a portion of the power house and main building at the plant of the Rowland Shovel Co., Central Avenue and Ashbourne Street, Cheltenham, Pa., with loss estimated at $18,000. It is planned to rebuild. The company is operated by the Ames Shovel & Tool Co., Boston.

The Harrisburg Light & Power Co., Harrisburg, Pa., has arranged for a bond issue of $275,000, the proceeds to be used in part for the acquisition of additional property and for extensions in plant and system.

Sullivan & Flynn, Wilkes-Barre, Pa., operating coal properties, have plans for a new coal breaker near the city limits to cost approximately $30,000.

A machine shop will be installed in the three-story automobile service and repair building, 100 x 120 ft., to be erected on Thirteenth Avenue, Altoona, Pa., by H. H. Fleck, Central Trust Building, estimated to cost $130,000 with equipment.

The Maccar Truck Co., Scranton, Pa., manufacturer of automobile trucks and parts, is disposing of a bond issue of $250,000, a portion of the proceeds to be used for extensions. W. D. Woodworth is vice-president and general manager.

The American School Slate Co., Slatington, Pa., will install additional equipment at its works, including power apparatus.

Manual training equipment will be installed in the two-story high school to be erected at Springfield, Pa., estimated to cost $150,000, for which bids are being taken on a general contract by Ritter & Shay, North American Building, Philadelphia,

The Pennsylvania Edison Co., Easton, Pa., has arranged for a bond issue of $791,00, a portion of the proceeds to be used for power plant extensions.

The Reading Engineering Works, 118 Washington Street, Reading, Pa., is inquiring for one or two model No. 41 Marion, railroad type, steam shovels. The company is also interested in a model No. 36 traction type shovel.

New England

BOSTON, Oct. 29.

OCTOBER will be one of the leanest months of 1923 in the New England machine-tool trade. Business the past week was very small, consisting of one or two machines here and there, mostly used equipment, none involving very much money, but some fairly good business is anticipated in November. Any real buying movement is not expected before early next year, however.

In checking up on possible prospects, dealers find a large number of requisitions in purchasing agents' hands, but actual purchases will not be made before 1924. It is also said several large manufacturing concerns intending to purchase lists of tools have been put off this year. Most of the tools sold the past week and under negotiation are production machines. The stability of prices in the face of the extreme dullness is, perhaps, the outstanding feature of this market.

The Edison Electric Illuminating Co. of Boston has purchased lifting and trolley equipment.

The Simmons Machine Tool Corporation, Albany, N. Y., has purchased the metal working equipment of the Pittsfield Machine & Tool Co., Pittsfield, Mass. The plant of the Pittsfield company recently was sold to paper manufacturers.

Plans will be refigured for a factory contemplated by the Marlboro Wire Goods Co., High Street, Marlboro, Mass.

Plans are being drawn for a one-story addition to the plant of the Carr Fastener Co., 31 Ames Street, Cambridge, Mass. Bids will be asked in about a month. The extension will give 16,000 sq. ft. manufacturing space.

Foundations are in for a one-story, 80 x 90 ft. automobile body plant on North Beacon Street, Allston, Boston, for John H. Wisbach, 1123 Commonwealth Avenue, Boston.

Sketches have been made for a three-story, $1,300,000 school to be erected on White Street, East Boston, by the city of Boston. Present plans call for manual training equipment. John M. Gray & Co., 175 High Street, Boston, are the architects.

The Textile Finishing Machine Co., Providence, R. I., has awarded contract for the erection of a machine shop on Simmons Avenue.

Heavy presses are to be installed in an addition to the plant of Bird & Son, Inc., East Walpole, Mass., now under construction. The capacity of the plant is to be doubled.

The Municipal Power Department, Wakefield, Mass., will commence the construction of a new one-story power house.

An electrically-operated pumping plant will be constructed by the Kennebec Water District, Waterville, Me., Dr. F. C. Thayer in charge. Metcalf & Eddy, 14 Beacon Street, Boston, are engineers.

Excavations are under way for a three-story and basement addition, 90 x 100 ft., at the plant of the Judd Paper Co., 166 Race Street, Holyoke, Mass., estimated to cost $85,000. The Casper Ranger Construction Co., 20 Bond Street, has the general contract.

The Warner Hammer Co., West Cromwell, Conn., has leased a building at Cromwell, totaling about 5000 sq. ft., and will remodel it for a new plant.

The Edison Electric Illuminating Co., 39 Boylston Street, Boston, is perfecting plans for the installation of coal and ash-handling machinery at its new plant at Weymouth, Mass.

The Hood Rubber Co., Watertown, Mass., has acquired the plant and property of the Union Carpet Lining Co., Arsenal Street, for extensions for the manufacture of tires and other rubber products.

Foundations will begin at once for a new hydroelectric power plant at Sunapee, N. H., for the Lake Sunapee Power Co., estimated to cost $100,000 with machinery. Charles T. Main, 200 Devonshire Street, Boston, is engineer.

D. W. Baldwin & Son, Park and Crown Streets, New Haven, Conn., manufacturers of automobile and motor truck bodies, have tentative plans for a new three-story plant on the site of the present works. Hilary Watts is head.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Nov. 13 for 12 ventilating sets, schedule 1509; until Nov. 6 for 50,000 attachment plug terminals, schedule 1503.

A machine shop will be installed in the new automobile service and repair building to be erected by J. A. Pilgard, 1026 Main Street, Hartford, Conn., on Ann Street, to cost $175,000 with equipment.

The Western Maine Power Co., Limerick, Me., has preliminary plans for a hydroelectric generating station on the Little Ossipee River at South Limington, Me., to cost more than $150,000.

The Curtis & Marble Machine Co., 100 Fremont Street, Worcester, Mass., has awarded a general contract to the E. F. Miner Building Co., Worcester, for a two-story addition to cost $20,000.

The Keene Gas & Electric Co., Keene, N. H., has work under way on a new hydroelectric power plant at Marlboro, N. H., estimated to cost $300,000 with machinery.

A hydroelectric power plant will be built by the Putnam Woolen Co., Putnam, Conn. It will be electrified and motors and other power equipment installed.

Baltimore

BALTIMORE, Oct. 29.

THE Baltimore Copper Smelting & Rolling Co., Canton, Baltimore, is said to have closed negotiations for the purchase of the former plant of the Canton Distillery, Clinton Street and Fourth Avenue, and will remodel it for extensions.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Nov. 20, for 6900 ft. of mechanical leather belting for Eastern and Western navy yards, schedule 1489; for 13 sets of valve reseating outfits for the Philadelphia, Mare Island and Puget Sound Navy Yards, schedule 1490; for crucibles for Eastern and Western yards, schedule 1508, and 31,734 ft. steel wire rope for the Puget Sound Navy Yard, schedule 1498.

The Common Council, Westminster, S. C., is planning for the installation of electrically-operated pumping machinery in connection with a new waterworks installation estimated to cost $150,000.

The Hugtite Clothes Pin Co., 417 South College Street, Charlotte, N. C., Ellis W. Henderson, head, has inquiries out for special wire-forming and working machinery for a new plant. Woodworking machinery, including a planer, will also be installed.

The Board of Directors, Teachers' Training College, Greenville, S. C., will commence the erection of a new power house at the institution estimated to cost $125,000.

F. L. Howell, Warrenton, Ga., is in the market for machinery to manufacture cement sewer pipe and kindred specialties.

The Industrial Machinery Division, Room 815, Bureau of Foreign and Domestic Commerce, Washington, will receive catalogs and price lists of veneer machinery for reforwarding office of the bureau at The Hague, Netherlands, which has inquiries for American equipment of this character. Also, for catalogs and price lists of machinery and equipment for furniture manufacture, for reforwarding to the bureau office at Pernambuco, Brazil.

The Nelstone Co. of Georgia, Inc., 509 Candler Building, Atlanta, Ga., recently organized with a capital of $250,000, will erect a one-story plant, 150 x 250 ft., for the manufacture of reinforced-concrete products under a special process, estimated to cost $110,000 including equipment. R. L. Langston is manager and engineer.

The Sullivan Brothers Coal Co., Short Gap, near Eckhart, Md., will install electric power and other machinery at its local properties. A new tipple will be constructed. It recently secured 500 acres of coal lands.

The Maimus Motor Works, Norfolk, Va., is arranging to rebuild the portion of its plant recently destroyed by fire with loss estimated at $27,000.

The Ideal Table Co., High Point, N. C., will take bids at once for a three-story plant, 60 x 100 ft., to replace its factory recently destroyed by fire with loss of about $70,000. Electrically-operated machinery will be installed. B. C. Royal is president and general manager.

The Carolina Power & Light Co., Raleigh, N. C., is arranging for an increase in capital from $8,000,000 to $12,000,000, a portion of the proceeds to be used for electric generating plant construction and transmission line extensions.

The Chief of Air Service, United States Army, Washington, will take bids until Nov. 6 for 100 sets of fuel tanks, circular 24-44; also for 87,500 hose clamps, circular 24-45.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for a boiler feed pump and feedwater heater. Also, for one 50 to 75-hp. horizontal return tubular boiler, with stack; one steel water tank and tower, 100 ft. high, with tank capacity of 100,000 gal.; a number of steel storage tanks, capacity about 6000 bbl. each; and for a number of electric transformers 1 to 15 kva. capacity.

The Pan-American Petroleum & Transport Co., 120 Broadway, New York, has acquired a substantial interest in the plant and business of the American Oil Co., Baltimore, with works on Clarkson Street. Plans are under advisement for extensions and the installation of additional machinery.

Lorick & Lowrance, Columbus, S. C., are in the market for an electric-operated grinding machine.

The Home Milling Co., Leesville, S. C., is planning for the installation of additional equipment, including mechanical conveyors, grinding machinery, pulleys, shafting and other transmission apparatus. J. H. Epting is president.

The Board of Aldermen, Rocky Mount, N. C., has preliminary plans for extensions in the municipal electric light and power plant and the installation of additional machinery.

The Denmark Fertilizer Mfg. Co., Denmark, S. C., recently organized, will install electric motors and other power equipment, with mixing machinery, tanks and other fertilizer equipment in a local plant, for which plans are being prepared. J. D. Prothro, Aiken, S. C., is one of the heads of the company.

J. R. Neves, Fort Gaines, Ga., has inquiries out for a high speed planer.

The Hackley Morrison Co., Inc., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a 75-hp. slip ring motor, second-hand in good condition; also for a number of electric transformers.

The Roanoke Water Works Co., Roanoke, Va., is planning for extensions and improvements in its plant, to include the installation of additional electrically-operated pumping machinery. F. W. Collins is vice-president.

A power plant will be constructed by the Arcadia Mills, Inc., Arcadia, S. C., in connection with a new textile mill to cost $300,000. Lockwood, Greene & Co., Charlotte, N. C., are engineers.

The Everett Brothers Motor Co., Athens, Ga., Thomas R. Everett, president, has acquired property at Brunswick, Ga., heretofore devoted to the manufacture of marine engines. The works will be improved and equipment installed for the production of a special engine developed by the new owner.

The Vidette Lumber Co., Inc., Vidette, Ga., has inquiries out for an engine, boiler and auxiliary power house equipment.

The Maryland Glass Co., Mount Winans, Baltimore, has awarded a general contract to the Austin Co., Cleveland, for two new buildings at its plant, 100 x 120 ft., and 60 x 140 ft., estimated to cost $65,000.

Louis A. Tarr, Inc., Sharp and Conway Streets, Baltimore, machinery dealers, is in the market for about 600 new boiler tubes, 3 in. x 12 ft.

Grove Park Inn, Asheville, N. C., is inquiring for a Bristol recording voltmeter, 110 to 220 d.c.; also for a motor-driven grindstone, about 24 to 30 in, 220 d.c.

Buffalo

BUFFALO, Oct. 29.

THE Thermo Automatic Oil Burner Corporation, Buffalo, incorporated with capital stock of $200,000, will manufacture industrial and domestic oil burners. Contracts will soon be let for considerable material, including temperature control units, gas control units, copper coils, flush tank ball cocks, gas pilot lights and brass and iron castings. Preparations are under way to maintain distributing centers the country over.

The Medina Case & Furniture Co., Inc., East Center Street, Medina, N. Y., is planning for the rebuilding of the portion of its plant recently destroyed by fire. New equipment will be installed.

The Delaware, Lackawanna & Western Railroad Co., 90 West Street, New York, is planning for the construction of a new engine house, with repair shop, at Binghamton, N. Y.

The Rochester Refrigerating Co., Rochester, N. Y., is planning the construction of an eight-story addition, to cost $100,000 including equipment.

Borden Brothers, 5-7 Endicott Avenue, Johnson City, N. Y., are planning for the installation of a lathe and drill press at their automobile service works.

Fire, Oct. 17, destroyed a portion of the plant of the Becker & Moore Co., Tonawanda Island, North Tonawanda, N. Y., manufacturer of wood fiber, etc., with loss estimated at $40,000, including planers, saws and other woodworking machinery. It is planned to rebuild.

The Water Commission, Potsdam, N. Y., is planning the installation of electrically-operated pumping machinery at its proposed waterworks plant, estimated to cost $175,000. Bogart & Pohl, 30 Church Street, New York, are consulting engineers.

John Schaaf, 1870-72 Genesee Street, Buffalo, has filed plans for a one-story plant to manufacture electric storage batteries. A repair department will be installed. It is estimated to cost $24,000.

The Penn Yan Boat Co., Penn Yan, N. Y., has awarded a general contract to W. A. Randall, Penn Yan, for a new one-story plant, 50 x 187 ft., to cost $45,000. It will replace a works recently destroyed by fire.

The American La France Fire Engine Co., Elmira, N. Y., with branch works at Bloomfield, N. J., for the manufacture of motor trucks, has disposed of a bond issue of $2,000,000, a portion of the proceeds to be used for extensions and improvements.

The Bemis Brothers Bag Co., St. Louis, has acquired the plant of the Kelly-Springfield Tire Co., 711 Northland Avenue, Buffalo, consisting of a number of buildings, two and five stories, 106 x 450 ft., for new works, and plans the early installation of electric power and other machinery. Frank W. Copley is general manager.

The Daily News Paper Corporation, North Tonawanda, N. Y., recently formed with a capital of $1,000,000, has commenced foundations for its new mill on Little Island, to cost $500,000 with machinery. The company is a subsidiary of the Ontario Paper Co., Thorold, Ont. Warren Curtis is general manager.

Pittsburgh

PITTSBURGH, Oct. 29.

INQUIRIES for machine tool equipment are fairly active, but orders are very slow in being closed. The sentiment here is that a great deal of equipment will be needed within the next four to six months, and inquiries are being put out more to get a line on prices for estimating purposes than with the idea of closing in the near future. Most of the equipment inquired for will not be needed possibly until after the first of the year, and intending buyers feel that in holding off placing orders they may be able to avail themselves of lower prices. Two or three large jobs are pending and one may be closed within the next two or three days.

The Jones & Laughlin Steel Corporation is figuring on putting in at its South Side works a large combination bar mill, but has not fully decided whether it will be built. If the project goes through, it will be in the market for considerable equipment.

There is a good deal of live crane inquiry, but chances are only a small part of it will be closed before the first of the year.

The Brown & Zortman Machinery Co. has sold to the American Sheet & Tin Plate Co. two keyseaters and a slotter.

The West Penn Power Co., Pittsburgh, will build at Cheat Haven, Pa., a hydroelectric plant in which will be installed four large units of generators and turbines. The size is not yet known and bids have not yet been asked. This will be the largest power plant near the Pittsburgh district, and will require a very large amount of equipment.

The announcement that the Youngstown Sheet & Tube Co. will build a blast furnace and two buttweld pipe mills at Indian Harbor, is of particular interest to local machinery dealers as it is expected that a good part of the equipment will be bought in the Pittsburgh district.

Bids are being taken by the Iron Trade Products Co., Louis J. Adler, head, Farmers' Bank Building, Pittsburgh, for a new two-story and basement plant at Reedsdale, Walker and Brown Streets. W. E. Clark, 1204 Arch Street, is architect.

The Pennsylvania Railroad Co., Pittsburgh, has tentative plans for the construction of new locomotive and car shops

in the vicinity of Dennison, Ohio, to cost $1,500,000 with machinery.

The Griffin Mfg. Co., Cherry and Huron Streets, Erie, Pa., manufacturer of shafting and kindred products, has work in progress on a new one-story plant, 80 x 235 ft., fronting on the line of the New York Central Railroad, estimated to cost $50,000. J. C. Griffin is president.

The Carbon Fuel Co., Carbon, W. Va., is planning the installation of electric power and other equipment at its plant. K. D. Quarrier, Carbon, is in charge. J. R. Thomas, Charleston, W. Va., is president

The Board of County Commissioners, Court House, Pittsburgh, has plans for the erection of a two-story repair and work shop, 70 x 325 ft., in the Parkview district, estimated to cost $200,000 with equipment.

The Common Council, Belington, W. Va., is planning to rebuild the portion of the municipal electric power plant recently destroyed by fire, with loss estimated at $30,000, including equipment.

James J. Weiler & Sons, Robson-Prichard Building, Huntington, W. Va., who have inquiries out for a traveling crane will also be in the market for a forge, drill, etc.

Work is under way on a one-story addition, 25 x 130 ft., to the plant of the Hollands Mfg. Co., 342 East Eighteenth Street, Erie, Pa., manufacturer of machine tools, estimated to cost $45,000, for which a general contract recently was awarded to C. Hazleton, 217 East Avenue.

The Monongahela Chain & Mfg. Co., Mannington, W. Vt., recently organized, has plans for the establishment of works to manufacture safety chains for automobile tires, and hardware specialties. A. B. Jolliff is president. F. W. Vance and William F. Staggers, both of Mannington, are interested in the organization.

The W. J. Early Sons Foundry Corporation has been formed under Delaware laws with capital of $500,000 to take over and expand the business of W. J. Early & Sons, Ltd., 812 Sarah Street, Pittsburgh, manufacturer of gray iron and special metal castings. A new heat treating process has been developed. Foundations are being laid for a new one-story foundry, 100 x 290 ft. John N. Early is president; Lee H. Marshall, vice-president; and Charles G. Mahey, secretary and treasurer.

A manual training department will be installed in the new two-story junior high school to be erected at Corry, Pa., estimated to cost $175,000, for which bids will soon be asked on a general contract by W. G. Eckles, Lawrence Savings and Trust Building, New Castle, Pa., architect.

Philip Williams, Elkins, W. Va., has inquiries out for coal crushing machinery for installation in a local building, with daily capacity of about 175 tons.

Work will soon be placed under way on a two-story addition, 40 x 80 ft., at the plant of the Kane Mfg. Co., Kane Pa., manufacturer of wire products, to cost about $37,000.

The State Board of Control, Charleston, W. Va., James S. Lakin, president, will take bids in about 60 days for a new three-story industrial school for boys at Maggie, W. Va., estimated to cost about $150,000. T. T. Stansbury, Martinsburg, W. Va., is architect.

The West Virginia Match Co., Wheeling, W. Va., will remodel a two-story and basement building, 100 x 100 ft., at Thirty-sixth and McColloch Streets, to cost about $50,000, and will install electric power and other equipment. F. F. Harris, 1117 Chapline Street, is architect. E. L. Yeager heads the company.

The Harbison-Walker Refractories Co., Farmers' Bank Building, Pittsburgh, will defer the erection of its proposed new plant at Bessemer, Ala., for the manufacture of fire brick and refractories until next year. It is estimated to cost $500,000 with machinery. W. C. Iffarth is chief engineer.

Detroit

DETROIT, Oct. 29.

BIDS will soon be asked by the Miller-Seldon Electric Co., 1259 West Park Place, Detroit, manufacturer of electrical equipment, for a two- or three-story addition, 60 x 225 ft., estimated to cost $80,000, for which plans are being completed by Baxter, O'Dell & Halpin, Hammond Building, architects.

The Michigan Stamping Co., 11631 Mack Avenue, Detroit, will take bids immediately for a one and two-story addition to cost approximately $75,000. Albert Kahn, 1000 Marquette Building, is architect.

Manual training equipment will be installed in the new three-story and basement high school to be erected at Flint, Mich., estimated to cost $750,000, for which bids will be asked on a general contract at an early date. Malcomson & Higginbotham, F. P. Smith Building, are architects.

The Rickenbacker Motor Co., 4815 Cabot Street, Detroit, has commenced an expansion program at its plant to double the present capacity. The initial work will consist of an addition, totaling about 60,000 sq. ft. of floor area, largely for assembling, to cost $80,000. The plant is now operating on a basis of 50 complete cars per day. B. F. Everitt is president.

Fire, Oct. 17, destroyed a portion of the pumping plant of the Grand Rapids Light Co., Grand Rapids, Mich., with loss estimated at $50,000 including machinery. It is planned to rebuild.

The Detroit Foundry Co., 2642 East Grand Boulevard, Detroit, manufacturer of gray iron castings, has tentative plans for a new one-story foundry on Christopher Avenue, Hamtramck, Mich., to cost $60,000. It is expected to break ground early next year. Frank Bromley is president.

Lorenz Brothers, Lansing, Mich., will commence the construction of a three-story automobile service and repair building on North Grand Street, 85 x 215 ft., to cost $90,000 including equipment.

The Hupp Motor Car Corporation, Mount Elliott Avenue, near Dunn Road, Detroit, has awarded a general contract to the Everett Winters Co., Book Building, for a one-story addition, 120 x 505 ft., estimated to cost $350,000 including machinery.

The Calumet & Hecla Mining Co., Calumet, Mich., is said to have preliminary plans under advisement for a copper rod manufacturing plant in the vicinity of its smelting works at Lake Linden, Mich., comprising the first unit of its proposed fabricating enterprises. It will cost $150,000 with equipment.

The Caille Brothers Co., 6210 Second Avenue, Detroit, manufacturer of coin slot machinery, will soon take bids on a general contract for a two-story addition, 80 x 100 ft., to cost $70,000. Baxter, O'Dell & Halpin, Hammond Building, are architects.

Chicago

CHICAGO, Oct. 29.

ALTHOUGH the distribution of the Burlington list has tentatively been made, few formal orders have yet been received by local dealers. This, however, will be merely a matter of a few days. The Rock Island Lines have issued inquiries for 10 tools, and the Illinois Central has entered the market for a motor-driven upright drill with 36-in. table and capacity for drilling 2½-in. holes with high speed drills. Additional railroad lists are expected to be issued soon, possibly before the end of the year.

Business from industrial sources is still very light, and for most dealers October is expected to be one of the poorest months of the year in new orders booked. Operations of industrial plants equipped with machine tools are spotty, some still being on a full time basis, while others have sharply curtailed their production. Few plants have work which will insure operations beyond the end of the year, and this lack of future business probably accounts for the general disinclination to purchase new tools at this time. Added to this factor of business uncertainty is the continued presence in the market of a considerable quantity of used tools which frequently prove prejudicial to the sale of new equipment. The list issued by the Rock Island Lines follows:

One 54-in. x 16-ft. heavy duty horizontal-spindle slab milling machine having a 4-in. arbor.

Two No. 5 Cincinnati, or equal, horizontal universal high power motor-driven milling machines.

Two helical slabbing cutters, 8 in. in diameter, 9 in. long, interlocking, for 3½-in. arbor with ½ round keyway.

One motor-driven 24-in. heavy duty turret lathe having 7½ in. hole through spindle.

One standard duplex motor-driven floor grinding wheel, 18 x 3 in.

One 1¾-in. Gridley four-spindle motor-driven automatic screw machine.

One Harrington, or equal, No. 4 staybolt threading machine head for Lassiter staybolt machine.

One Segur coil spreader complete with attachments.

The Whiting Corporation, Harvey, Ill., has taken the following orders for foundry equipment: No. 7 cupola for the Elyria Foundry Co., Elyria, Ohio; two batteries of 36 x 72-in. tumbling barrels with dust arrester for the American Car & Foundry Co., St. Louis; a No. 3 cupola for the Inman Mfg. Co., Amsterdam, N. Y.; a No. 9½ and a No. 8 cupola for the Wheeler Condenser & Engineering Co., West Carteret, N. J.; a 42 x 60-in. tumbling barrel for the Weir Stove Co., Taunton, Mass.; a 24 x 48-in. tumbling barrel for the Andes Foundry Co., Lancaster, Pa.

C. V. Champion & Co., 527 East Main Street, Danville, Ill., recently incorporated with $20,000 capital stock, will manufacture an electrically-operated corn popper. The company has leased a plant and in the near future expects to install a small engine lathe and a drill press, but has no other plans for the purchase of metal-working machinery. C. V. Champion is president and treasurer, and G. C. Corey, vice-president and superintendent of production.

The Foster-Bolton Co., 549 West Washington Boulevard, Chicago, recently incorporated with $25,000 capital stock, will confine its activities to the merchandising of steam specialties and will not engage in their manufacture at this time. Officers are Charles W. Foster, president; E. W. Bolton, treasurer, and Alice A. McAvoy, secretary.

The Kingsley Die Casting Co., Anderson, Ind., recently incorporated with $15,000 capital stock, has taken over the Forse Machine Co. of that city, and will continue to manufacture the products formerly made by the older organization, namely die castings and bearings. The officers include J. C. English, president; E. M. Kingsley, vice-president, and W. H. Forse, Jr., secretary and treasurer.

The Twentieth Century Saw Co., 846 North Keystone Avenue, Chicago, recently incorporated with $50,000 capital stock, will merchandise a patented hand saw which it is having manufactured under contract. The device is a combination of a hand saw, rule, bevel, square, miter, angle-indicator or protractor, and a level or angle-gage-attachment. Officers are John L. Larson, president; William E. Larson, vice president, and Charles P. Morris, secretary and treasurer.

The Reliable Machine Co., Rockford, Ill., will build a factory at 1103 Tenth Street, to cost $7,500.

The Yavapai Onyx Mining Corporation, a new industry with a plant on West Sixth Street, Dubuque, Iowa, has installed equipment and expects to start operation shortly. The company will manufacture onyx gear shift grips for miscellaneous products and do flat work for wainscoting in buildings, etc.

The Husted Co., Minneapolis, Minn., will build a steel fabricating plant and warehouse in the Northwestern Terminal. The first unit 50 x 170 ft., will cost $25,000, and an additional unit is contemplated for next year.

The Brown Sheet Iron & Steel Co., manufacturer of gas and oil tanks, Minneapolis, has purchased from the Diamond Iron Works the lease to the latter's former plant fronting on the Northern Pacific Railroad, near Twenty-second and Twenty-third Avenues, North. The Brown company will renovate the buildings at once for occupancy.

The Lorenson Harvester Co., LeClaire, Iowa, has moved its plant to Mound Street, East Davenport, Iowa. The latter, however, is a temporary location, and the company plans to purchase a site in the western part of Davenport for a new plant.

The St. Paul Union Depot Co. will erect a round house costing $75,000, adjoining the Union Depot yards at St. Paul, Minn.

Work has commenced on the construction of a power plant to cost $150,000 for the Michigan Agricultural College, Lansing, Mich.

The Western Pipe & Steel Co. of Illinois, manufacturer of corrugated welded pipe, has purchased 14½ acres, west of Western Avenue, east of the Baltimore & Ohio Railroad, and south of the Indiana Harbor Belt Line at Blue Island, Ill., and will erect a plant to cost $150,000. The main headquarters of the company are at 4948 Bloomingdale Road, Chicago.

The American Brake Shoe & Foundry Co., Chicago, has awarded contract for the construction of a foundry in North Kansas City, Mo., to cost $350,000.

C. H. Curtis, who recently opened a machine shop on West Fifth Street, Concordia, Kan., has removed to larger quarters in the Parrish Buick Building.

Van Gunten & Van Gunten, 26 East Huron Street, Chicago, are preparing plans for a two-story pattern shop, 75 x 175 ft., at First Avenue and First Street, Maywood, Ill., for William A. Kennedy.

The E. A. Baumbach Mfg. Co., 1812 South Kilbourne Avenue, Chicago, is taking bids on a two-story foundry addition, 30 x 75 ft., to cost $25,000.

The Ahlberg Bearing Co., 321 East Twenty-ninth Street, Chicago, has let contracts for a two-story plant, 35 x 110 ft., at 317-27 East Twenty-ninth Street, to cost $11,000.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, has awarded contract for a four-story power station, 112 x 232 ft., at 3601 South Crawford Avenue, to cost $900,000.

The Operators Piano Co., 16 South Peoria Street, Chicago, has awarded a contract for a three-story factory, 113 x 126 ft., at 713-35 North Kedzie Avenue, to cost $140,000.

The Fruin Drop Forge Co., 349 Root Street, Chicago, has awarded contract for a two-story addition, 38 x 49 ft., to cost $10,000.

The Western Electric Co., Hawthorne, Ill., has awarded a contract for a four-story warehouse, 160 x 180 ft., on Kostner Avenue, Chicago, to cost $1,000,000.

The Central Steel & Wire Co., 127 Peoria Street, Chicago, is taking bids on a general contract for a new two-story works at Western Avenue and Forty-fifth Street, estimated to cost $300,000. Emil E. Froman, 64 West Randolph Street, is architect and engineer.

The Globe Portland Cement Co., 416 McKnight Building, Minneapolis, Minn., will hold in abeyance the construction of its proposed mill at Dubuque, Iowa, for which plans recently were prepared by Charles L. Pillsbury, Capital Bank Building, St. Paul, Minn., engineer, with cost estimated at $2,000,000.

The Minneapolis Heat Regulator Co., Minneapolis, Minn., will commence the erection of a fourth floor to its present three-story plant at Fourth Avenue, South, and Twenty-eighth Street, estimated to cost $85,000 including equipment.

Bids will be received by M. T. Hoff, city clerk, Madison, Minn., until Nov. 5, for two hand-operated stokers, with hopper feed, for horizontal return tubular boilers at the municipal power plant.

The Department of Foreign and Domestic Commerce, Chicago Association of Commerce, 10 South La Salle Street, has received an inquiry from a company at Los Angeles, Cal., in the market for ice-manufacturing machinery, No. 2461; also from a company at Pernambut, India, desiring to purchase American cigarette-making and match manufacturing machinery.

The American Car & Foundry Co., 80 East Jackson Boulevard, Chicago, will commence the construction of a new foundry at Madison, Ill., to cost in excess of $80,000.

The Fire Pump & Equipment Co., 30 North Michigan Avenue, Chicago, is inquiring for used duplex underwriters fire pumps, 500 to 1000 gal.

Cincinnati

CINCINNATI, Oct. 29.

WHILE there was little increase in the number of orders booked the past week, inquiries were more numerous. Most of these were for one and two machines, but several fair-sized lists are being figured. Among these is the Norfolk & Western Railroad which calls for 15 tools, including three radial drills, five engine lathes, three boring mills, two milling machines, one grinder and miscellaneous small tools. The Baltimore & Ohio Railroad has issued a list for its Glenwood shops, which includes 10 engine lathes. A Milwaukee manufacturer is in the market for miscellaneous machine tool equipment.

Interest is being shown in Japanese buying of machine tool equipment. A local manufacturer of engine lathes booked an order for 12 machines, on which immediate delivery was imperative and the order was filled from stock. Another order for used machine tools for Japanese delivery is reported to have been negotiated locally. Tools for Japan are expected to be much in demand during the next two or three months.

The Ash Cabinet Co., Dayton, Ohio, recently incorporated, is contemplating the erection of a manufacturing building. It manufactures metal cabinets and is planning to make metal toys. A. S. Hageman is president.

The Hinde Paper Box Co., Circleville, Ohio, is contemplating the erection of a plant for the manufacture of fibre containers. The new building will be 80 x 340 ft. Box-making machinery, electrically driven, will be installed.

The Wellston Metal Products Co., Wellston, Ohio, has been organized to take over the factory operated by G. L. Ferris at McArthur, Ohio, in the manufacture of minnow traps, sectional steel boats, washing machines and steam cookers. The business will be moved to Wellston and Mr. Ferris will remain with the company for a time.

The James Leffel Co., Springfield, Ohio, manufacturer of turbine water wheels, has awarded contract for an addition to its boiler shop, 40 x 140 ft.

The National Glass & Lens Co., Lancaster, Ohio, has been incorporated with a capitalization of $75,000 and has

awarded contract for a plant to manufacture ground, polished and silvered lens, as well as pressed and blown glassware. It is expected to be ready for operation about Jan. 1 and 100 men will be employed. Albert Steiner is president.

The plant of the Madisonville Ice & Laundry Co., Madisonville, Ky., was damaged to the extent of $100,000 by fire Oct. 22. The ice making plant and equipment were practically destroyed. It will be rebuilt.

The City Ice & Fuel Co., Cleveland, operating plants in Cleveland, Cincinnati, and Columbus, has purchased property on West Broad Street, Columbus, and is preparing plans for an ice manufacturing and storage plant, work on which will start this fall.

The Cincinnati Artistic Wrought Iron Works, 2941 Eastern Avenue, Cincinnati, has tentative plans for rebuilding the portion of its plant recently destroyed by fire with loss approximating $27,000.

The Springfield Brass Co., 821 West Main Street, Springfield, Ohio, will soon take bids for a new one-story foundry, estimated to cost $13,000, exclusive of equipment.

Milwaukee

MILWAUKEE, Oct. 29.

MACHINE-TOOL manufacturers report that October business held its own with September, but in a majority of instances volume fell below that of the same month a year ago. Large-lot business remains absent and trade consists of single tool purchases, with a sprinkling of orders for two or three machines. Buyers have been flocking to the Mitchell Motors Co. at Racine, Wis., to take advantage of the bargains offered by the relatively enormous lot of machine tools being liquidated at bankrupt sale, it having been decided to dismantle the entire plant as no satisfactory bulk bid could be obtained. Several thousand machines of all descriptions are being offered and disposition is proceeding with unexpected rapidity.

The Great Lakes Boat Building Corporation, 333 Becher Street, Milwaukee, has passed into the control of a Chicago syndicate, and arrangements are being made to transfer the works to Chicago, where a 15-acre site has been leased for 20 years at Belmont Avenue and the north branch of the Chicago River. Construction will begin about March 1. The investment will be in excess of $750,000. William C. Morehead will continue as president and Walter D. Beauvais, engineering department Naval Air Service, will become chief engineer.

The Algoma Foundry & Machine Co., Algoma, Wis., is erecting a two-story extension, 50 x 100 ft., to its foundry, to be used largely for warehouse purposes, and the space thus released will be devoted to additional machine shop facilities. A small list of equipment is being purchased. The company manufactures gas engines and farm machine specialties.

The Logemann Brothers Co., 3130 Burleigh Street, Milwaukee, manufacturer of hydraulic and power baling presses, rams, etc., will build a one-story brick and steel addition, 50 x 150 ft., to be used as an erecting shop. Equipment will include one 10-ton electric traveling crane on which figures are being taken.

The Badger Showcase Co., 133 North Pearl Street, Green Bay, Wis., is letting contracts for a new factory and power plant estimated to cost $75,000 complete, at South Broadway and the Northwestern and Milwaukee road tracks. The main building will be 60 x 160 ft., two and three stories, and the power house, 35 x 40 ft. A dry kiln unit also is planned. In the new factory the company will make all metal parts and fixtures. Machinery and additional woodworking tools, with individual electric motor drive are being purchased. John H. Bruecker is president and general manager.

The Burlington Metal Products Co., Burlington, Wis., has leased a building at Eighteenth Street and Thurston Avenue in Racine, Wis., and will establish an automatic screw machine shop. The equipment has been derived from the bankrupt Mitchell Motors Co., which will suffice for the present.

The Underwood Veneer Co., Wausau, Wis., will build a new sawmill with an 8-ft. single band saw and a 300-hp. generating plant, to be ready Jan. 1. Early next spring a planing mill of similar capacity will be erected. Equipment orders for both units are now being placed.

The Board of Education, New London, Wis., has engaged Smith, Reynolds & Brandt, architects, Manitowoc, Wis., to design a new high and vocational school to cost about $300,000. It will consist of a vocational wing, 50 x 75 ft.; auditorium, 61 x 126 ft.; gymnasium, 61 x 118 ft., and classrooms, 60 x 100 ft.; all two stories and basement. Bids will be taken about Dec. 1. R. J. MacMahon is superintendent of schools.

The Kickapoo River Power Co, Madison, Wis., is being incorporated with $1,000,000 capital to build and operate a hydroelectric generating plant on the Kickapoo River near Wauzeka, Wis. The dam will be 30 ft. high and develop 1700-2000 hp. The project is in charge of E. E. Dillon, consulting engineer, Madison. Work is to start about March 15.

The Pine-Ihrig Co., Oshkosh, Wis., which recently acquired the assets of the defunct Washkosh Mfg. Co., power and manual washing machines, has transferred the entire equipment and stock to the second floor of its woodworking machinery plant and will continue the operation. A few items of new equipment are being purchased. E. W. Ihrig is president.

The North Milwaukee Foundry Co., Commerce Avenue, North Milwaukee, Wis., let the general contract to Charles Huebbe, 1534 West Twenty-fourth Street, Milwaukee, for a foundry addition, 65 x 75 ft. An additional cupola will be installed. Joseph Ewens is president.

The Board of Education, Wausau, Wis., has let contracts for the foundations and substructure of a $500,000 addition to the Central High School, to be completed Sept. 1, 1924. It will be 200 x 270 ft., two stories and basement, and contain a general vocational school, automobile mechanics department, sheet metal shop, drafting room, etc. Bids on the superstructure will be taken about March 15. The architects are Oppenhamer & Obel, Wausau. W. A. Tegge is president of the board.

The Newman Electric & Mfg. Co., Eau Claire, Wis., has been incorporated with $25,000 capital stock by H. E. Newman, K. L. Bowley and E. J. Sostad to manufacture electrical specialties and do general repair work on motors, generators, etc. It is the outgrowth of a small business which will be enlarged and housed in new quarters shortly.

The partnership of F. A. Albertus & Co., conducting a welding and machine repair shop at 2640-2642 Fond du Lac Avenue, Milwaukee, has been dissolved and Clayton S. Flint retires. The business will be continued under its present name by Floyd A. Albertus.

Albert Blecker and Edward W. Gollin, doing business as the Wisconsin Sheet Metal Works, 2928 Lisbon Avenue, Milwaukee, have dissolved partnership. The entire interest is now vested in Mr. Gollin, who will conduct the business under the present name.

The Gulf States

BIRMINGHAM, Oct. 29.

WORK will commence on a new plant at North Gadsden, Ala., by the Coosa Pipe & Foundry Co., Birmingham, with present works at Gadsden, for which a general contract has been awarded to the Ingalls Iron Works, Birmingham, estimated to cost $80,000, including equipment. The output will be increased about 25 per cent.

The Decatur Cornice & Roofing Co., Decatur, Ala., is planning to rebuild the portion of its works destroyed by fire Oct. 23, with loss of $55,000 including equipment.

W. M. Smith & Co., Birmingham, has inquiries out for an electric magnet to use with a locomotive crane, with or without generator.

Fire, Oct. 15, destroyed a portion of the plant of the Forney Oil Mill Co., Forney, Tex., manufacturer of cottonseed oil products, with loss estimated at $80,000, including equipment and stock.

The Houston Lighting & Power Co., Houston, Tex., is disposing of a bond issue of $2,000,000, a portion of the proceeds to be used for extensions in plants and system. Edwin B. Parker is president.

The Humble Oil & Refining Co., Great Southern Life Building, Dallas, Tex., is planning the construction of a new gasoline refinery in the vicinity of Mildred, Tex., estimated to cost $200,000 with machinery.

Bids will be received by E. D. Parker, city clerk, Ponchatoula, La., until Nov. 20, for two motor-driven centrifugal pumps, each with capacity of 750 gal. per min., or oil-engine driven power pumps for installation in a new waterworks plant; also for a 50,000-gal. steel tank and tower, cast iron pipe, valves, fittings, etc. Swanson-McGraw, Inc., 705 United Fruit Building, New Orleans, is engineer.

The Houston Power Co., Newton, Ala., has plans for the construction of a new hydroelectric generating plant on the Choctawhatchee River, Dale County, with initial capacity of 3000 kva., estimated to cost $400,000, with power dam and transmission system. The Southern Engineering Co., Albany, Ga., is engineer.

The W. K. Spark Plug Corporation, 1104 Scott Avenue, Wichita Falls, Tex., recently organized, is perfecting plans for the establishment of a factory to manufacture spark

plugs, etc. F. D. Woodruff, secretary-treasurer and general manager, is in charge.

The Common Council, Marshall, Tex., plans for the installation of electrically-operated pumping machinery at the waterworks, in connection with extensions and improvements estimated to cost $80,000.

Henry L. Sherrod, Gadsden, Ala., is organizing a company to build an ice-manufacturing plant, for which a site, 120 x 155 ft., has been purchased. The initial works will cost approximately $100,000 with machinery. Mr. Sherrod will be secretary, treasurer and general manager.

The Hercules Powder Co., Wilmington, Del., has closed negotiations for 600 acres near Bessemer, Ala., and is reported to be planning to use the property for a new branch powder and explosive works, to cost $350,000 with equipment.

The Voth Hardwood Co., Beaumount, Tex., a subsidiary of the Kirby Lumber Co., Houston, Tex., has tentative plans for two new hardwood plants, with power houses, to cost more than $300,000. A new hardwood flooring mill in the vicinity of Voth is also under consideration, to cost more than $100,000 with electric power and other equipment.

The Gadsden Car Works, Gadsden, Ala., will hold in abeyance the reconstruction of the portion of its works, including erecting shop, recently destroyed by fire with loss estimated at $250,000 including equipment. C. H. Bradley is superintendent.

Bids are being asked by the Common Council, Moorhead, Miss., until Nov. 6, for a new waterworoks plant, including pumping machinery, towers, tanks and auxiliary equipment, as per plans and specifications on file. H. A. Mentz, Magnolia, Miss., is consulting engineer.

The Interstate Investment Co., Tampa, Fla., is having plans prepared for the construction of a new cold storage plant in connection with a group of buildings, estimated to cost $750,000. Lockwood, Greene & Co., Healey Building, Atlanta, Ga., are engineers. J. T. Swann, Citizens Bank Building, Tampa, is vice-president.

The Moreman Gin Co., Corpus Christi, Tex., is planning the installation of oil-operated engines, transmission equipment and other conveying machinery in two new cotton ginning plants on neighboring sites. R. L. Moreman is head.

The Dallas Power & Light Co., Dallis, Tex., has commenced the construction of a new power house at Frank and Tuttle Streets, North Dallas, to cost about $200,000 with machinery.

The Common Council, New Iberia, La., has tentative plans for a new municipal electric light and power plant, to replace the present station, estimated to cost $65,000.

The Houston Ice & Cold Storage Co., Houston, Tex., is planning for enlargements and the installation of additional machinery to develop an output of 125 tons per day. A. F. Engel is general manager.

The Smith & Neil Co., Jacksonville, Fla., manufacturer of automobile bodies, has acquired property adjoining its plant on Zielle Street, 75 x 150 ft., for a new works. The forge shop and body-building department will be removed to the new structure and additional equipment installed.

The Benson Hardware Co., Andalusia, Ala., is inquiring for 25 patterns for solid cast iron pulleys, size 2- to 12-in. face, 6 to 24-in diameter.

The New Hope Gravel Co., Inc., Columbus, Miss., is in the market for a 40 to 50-ton standard gage geared locomotive.

The Eco-Thermal Stove Co., Inc., Alexandria, La., incorporated with capital stock of $100,000 to manufacture stoves and heating equipment, is looking for a manufacturing location. Stephin S. Thomas, Box 139, heads the company.

The Central South

ST. LOUIS, Oct. 29.

THE Mendenhal Motor Co., 2317 Locust Street, St. Louis, is taking bids for a new four-story service and repair building, 39 x 155 ft., on Locust Street, to cost $100,000 including equipment. W. P. Mahon, Title Guarantee Building, is architect.

The Southern Anthracite Coal Co., Russellville, Ark., is considering tentative plans for the rebuilding of its coal tipple destroyed by fire, Oct. 17, with loss estimated at $100,000 including machinery.

The Common Council, Cookeville, Tenn., is planning the installation of electrically-operated pumping machinery in connection with extensions in the municipal waterworks to cost about $85,000.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., machinery dealer, has inquiries out for bench attachments for 8 and 10-gage circular saws, 72 in. diameter and smaller.

The Banfield Brothers Packing Co., Springfield, Mo., will build a cold storage plant in connection with its proposed two- and three-story packing house, estimated to cost $100,000. Keckenlively & Mark, Springfield, are architects.

The Electric Storage Battery Co., Nineteenth Street and Allegheny Avenue, Philadelphia, has awarded a general contract to the Wimmer Construction Co., Victoria Building, St. Louis, for the first unit of its proposed plant at Chouteau and Vandeventer Avenues, St. Louis, 130 x 245 ft., to cost $100,000. A large portion of the works will be given over to assembling.

The Quick Meal Stove Co., Kings Highway, St. Louis, a subsidiary of the American Stove Co., same address, has awarded a general contract to the Kellerman Construction Co., Victoria Building, for a one- and two-story addition, 85 x 316 ft., estimated to cost $85,000.

The Memphis Power & Light Co., Memphis, Tenn., has tentative plans for an addition to its main generating station to cost $1,000,000 with machinery. A 20,000-kw. turbo-generator and auxiliary equipment will be installed. It is expected to commence work early next year.

Bids will be received by the United States Engineer Office, Nashville, Tenn., until Nov. 10, for one full Diesel marine engine complete, circular 24-131.

The Lawrence Iron Works, Sixth Street, Lawrence, Kan., is planning the installation of a keyseater and other equipment.

Electric motors, controls, conveying and other machinery will be installed at the proposed plant of the Inland Printing & Binding Co., Springfield, Mo., to replace its works destroyed by fire, Oct. 21, with loss estimated at $200,000 including machinery.

Manual training equipment will be installed in the new two-story junior high school to be erected at Thirty-ninth Street and Hyde Park Avenue, Kansas City, Mo., estimated to cost $500,000, for which foundations will be laid at once. C. A. Smith, Finance Building, is architect.

Bids will be received by the United States Engineer Office, Postal Telegraph Building, Kansas City, Mo., until Nov. 5, for 37,287 pounds of buttonhead rivets, circular 24.

The West Side Machine Co., Webb City, Mo., is planning for the installation of a lathe, drill press and other equipment.

The St. Joseph Lead Co., St. Joseph, Mo., with headquarters at 60 Wall Street, New York, has acquired the properties of the Federal Lead Co., a subsidiary of the American Smelting & Refining Co., 120 Broadway, New York, in the vicinity of its plant at Bonne Terre, Mo., for $10,000,000. Plans are under way for enlargements and the installation of additional equipment. The American Smelting company has contracted with the St. Joseph company for handling material at its Federal smelter, near St. Louis, and will install additional machinery to cost $150,000.

The Missouri Rubber Products Co., care of Laurence Schmitt, Colonial Hotel, Springfield, Mo., is perfecting plans for a new plant to manufacture tires, tubes and mechanical rubber products. The main building will be 90 x 280 ft., estimated to cost $400,000 including machinery.

The Turner, Day & Woolworth Handle Co., Adams Street, Nashville, Tenn., has awarded a general contract to the H. P. Jacobs Construction Co., Independent Life Insurance Building, for a new two-story plant, 60 x 150 ft., to replace a portion of its works recently destroyed by fire. It will cost about $50,000 including equipment. Other units will be erected later.

The ice-manufacturing plant of the Madisonville Ice & Laundry Co., Madisonville, Ky., was destroyed by fire, Oct. 22, with loss estimated at $90,000 including machinery. It is planned to rebuild.

The Common Council, Paintsville, Ky., is planning the installation of electrically-operated pumping machinery at the municipal waterworks in connection with extensions to cost about $50,000.

Fire, Oct. 14, destroyed a portion of the plant of the Pine Bluff Cotton Compress Co., Pine Bluff, Ark., with loss estimated at $50,000 including equipment. It is planned to rebuild.

The Fred A. Groves Motor Co., Cape Girardeau, Mo., will install a machine shop in its new two-story service and repair building, 100 x 100 ft., estimated to cost $85,000, for which a general contract has been awarded to the Gerhart Construction Co., Cape Girardeau.

The Wabash Railway Co., St. Louis, is considering the erection of an addition to its engine house and repair shops at Moberly, Mo., to cost $65,000. A. O. Cunningham is chief engineer.

The Board of Works, Knoxville, Tenn., plans for the installation of electrically-operated pumping machinery in connection with extensions and improvements in the municipal waterworks to cost $2,000,000. A bond issue is being arranged.

The Prest-O-Lite Co., Inc., 30 East Forty-second Street, New York, manufacturers of acetylene products, etc., will commence the erection of a branch plant at Tulsa, Okla., to cost $60,000.

The Kansas City Light & Power Co., Grand Avenue, Kansas City, Mo., has awarded a general contract to the Edelman-Fleming Construction Co., New York Life Building, for a one-story automobile service and repair building for company trucks and cars, estimated to cost $95,000, with equipment.

The Niedringhaus Metalware Corporation, Goodfellow and Natural Bridge Avenues, St. Louis, is in the market for a No. 408-B Bliss press or equal; double crank press, 24 x 42-in. between housings, weight 7000 to 9000 lb., also a No. 92½-H Toledo press or equal.

Cleveland

CLEVELAND, Oct. 29.

THE machinery market has been dull the past week. Dealers booked a fair volume of scattering orders, mostly for single machines, but no new inquiries of any size developed. The New York Central railroad has not yet made purchases against its recent list. The Pennsylvania Railroad has sent out an inquiry for a 4-in. pipe threading machine for its Columbus, Ohio shops. This inquiry is in line with the company's policy of buying equipment piecemeal for those shops. Some purchases were made recently and it is expected that other equipment will be required.

The White Motor Co., Cleveland, has had plans prepared for a one-story addition, 100 x 100 ft.

The Wilson Rubber Co., Canton, Ohio, will erect a four-story factory to cost approximately $65,000.

The Toledo Factories Co., Toledo, Ohio, has placed a contract for a factory, 40 x 100 ft., to be occupied by the Luckey Auto Repair Co.

The American Electrical Switch Co., Minerva, Ohio, has been organized to take over the plant of the former Lewis Electrical Co., and has purchased the equipment. Charles P. Wolfe is general manager of the new company.

The plant of Erie Tire & Rubber Co., Sandusky, Ohio, will be sold by order of the court. The date for the sale was not named. The minimum price was set at $1,000,000.

The pattern department of the Will-Burt Co., Orville, Ohio, has been leased by Frank Porter and C. W. Mackey, Wooster, Ohio, who will engage in the jobbing pattern business.

The Anderson Rolled Gear Co., Lakewood, Ohio, is in the market for a Brown & Sharpe No. 13 heavy gear cutter with indexing head and mechanism in good condition.

The National Stove Co., Lorain, Ohio, a subsidiary of the American Stove Co., St. Louis, has plans nearing completion for an addition to cost $100,000 with equipment.

Indiana

INDIANAPOLIS, Oct. 29.

PLANS are being perfected by the Indiana & Michigan Electric Co., South Bend, Ind., for a new generating plant near the city, to cost $500,000 with machinery. The company is operated by the American Gas & Electric Co., 30 Church Street, New York.

The Marion Experimental Co., Indianapolis, has perfected plans for the establishment of a new machine and mechanical shop at 846 Virginia Avenue.

The Standard Oil Co., Indianapolis, will build a new storage and distributing plant at English, Ind., to cost $50,000 with equipment.

The Interstate Public Service Co., Indianapolis, will issue bonds for $126,000 and stock for $75,500, a portion of the proceeds to be used for the purchase of the Jeffersonville Water, Light & Power Co., Jeffersonville, including power plant and system, and the installation of additional equipment.

The Connersville Automobile Dealers' Association, Connersville, Ind., comprising a number of local automobile companies, will install a machine and repair shop in its new building, estimated to cost $65,000. Fechtman & Cooley, local Ford representative; Green Brothers, local representative for the Overland automobile; and Ward Halliday, representative for the Buick automobile, are interested in the organization.

The Western Gas Construction Co., 1427 Buchanan Street, Fort Wayne, Ind., manufacturer of industrial gas plant equipment, oil refining machinery, etc., has plans for a two-story addition to its machine shop, 85 x 93 ft., estimated to cost $50,000.

William Randel, 212 West Franklin Street, Greencastle, Pa., has work in progress on a new one-story automobile service and repair building, 75 x 110 ft., estimated to cost $40,000. The International Steel & Iron Co., Evansville, Ind., is architect.

The American Steel & Wire Co., Anderson, Ind., has awarded contract for a new boiler plant containing four 800-hp. boilers.

The Robinson-Wagner Co., Lafayette, Ind., has been incorporated with capital stock of $500,000 to manufacture agricultural machinery and implements, including farm wagons, trucks, commercial bodies and cabs. The company is in the market for equipment. J. M. Robinson is president and John Wagner secretary-treasurer.

Canada

TORONTO, Oct. 19.

THE Canadian machine tool market has become more active the past week. Sales, however, are scattered and in most cases are confined to lots of one or two tools, although a few fairly large contracts were closed during the week. Among the orders placed was one for the Portneuf Hydro Electric development to Canadian Vickers, Ltd., Montreal, for a 4000-hp. turbine, 360 r.p.m. The city of Winnipeg, Man., has awarded the contract for turbines and governors to Canadian Vickers, Ltd. at a cost of $118,800, and alternators to the Swedish General Electric, Ltd., Toronto, at $213,000, together with $5,275 worth of spare parts. A good volume of single orders for equipment from automobile concerns, saw and lumber mills has also been placed. Inquiry is more active and indications are that several mining companies are about to enter the market for equipment.

The Canadian railroads are showing renewed interest in equipment, and the Canadian Pacific Railway Co. is said to be contemplating the purchase of a number of locomotives.

Port Colborne, Ont., is contemplating the construction of a waterworks plant to cost $90,000. E. H. Darling, 72 James Street North, Hamilton, Ont., is consulting engineer.

The Southern Canada Power Co., Ltd., Montreal, has awarded the general contract to the Foundation Co., 233 Broadway, New York, for a concrete dam and power house in connection with $2,500,000 power development project at Drummondville, Que. Approximately 30,000 hp. will be developed.

The Continental Wood Products Co., Elsas, Ont., is contemplating erecting a pump mill.

P. W. Gardiner & Son, Galt, Ont., are having plans prepared for a planing mill and sash and door factory on Harris Street to cost $100,000.

A. Marleau, Alexandria, Ont., is in the market for a chain hoist.

Foisy & Hotte, Shawbridge, Que., are asking for complete equipment for a sash and door factory.

The Mount Royal Metal Co., Montreal, Que., is building an addition and is interested in brass and iron foundry equipment. J. E. Grivell, 3311 Lanorie Street, Montreal, is purchasing agent.

The Morrow Mfg. Co. has recently taken over the plant and business of W. L. Morrow & Co, Moncton, N. B., and proposes to make additions to plant and equipment. It is in the market for forge shop equipment, etc.

A. Racine, 1990 St. Dominique Street, Montreal, manufacturer of automobile bodies, carriages, etc., will purchase vulcanizing and welding machinery.

The Supreme Foundries, Lt., Pont Rouge, Que., is in the market for a squaring shear with open gap for 12-gage sheets, 63-in. folder for 20-gage sheets, one slip form roller 60-in., for 24-gage sheets.

The Nelson Bode Trap Co. of Canada, Windsor, Ont., recently incorporated with a capital stock of $50,000 to manufacture traps, steel and metal goods, etc., will establish an assembling plant at 32 Sandwich Street West, Windsor.

Tayler Brothers, Vankleek Hill, Ont., are asking for foundry equipment, including presses, etc.

The Canadian Watercraft, Ltd., Peterborough, Ont., is in the market for machinery and complete equipment for building boats, scows, barges, etc.

It is reported that the Dodge Brothers Motor Car Co. have taken over the plant of the Walker Twist Drill & Tool Co., Windsor, Ont. The plant is being renovated preparatory to the installation of equipment for assembling motor cars for the Canadian trade.

The Christie Co., Murray Street, Niagara Falls, Ont., will purchase special machinery, shafting, hangers, pulleys, etc., for a new plant to cost $60,000.

The Pacific Coast

SAN FRANCISCO, Oct. 24.

TENTATIVE plans are being considered by the Paraffin Companies, Inc., 40 First Street, San Francisco, manufacturer of box board, etc., for rebuilding the portion of its plant and power house at Antioch, Cal., destroyed by fire, Oct. 15, with loss estimated at $400,000 including machinery.

The Union Oil Co., Union Oil Building, Los Angeles, has plans for the construction of a new storage and distributing plant near Brea, Cal., to cost $1,000,000 with equipment.

The Victor Oxy-Acetylene Equipment Co., 884 Folsom Street, San Francisco, has awarded a general contract to Barrett & Hilp, 918 Harrison Street, for a one-story addition to cost about $25,000.

The Common Council, Port Angeles, Wash., is planning for the installation of electrically-operated pumping machinery in connection with a new waterworks system estimated to cost $500,000. The Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is consulting engineer.

The Capitol Spark Plug Co., Marysville, Cal., manufacturer of spark plugs, automobile bumpers, etc., has plans for a new factory near the State Highway and will commence excavations at once. It will cost $50,000, with equipment.

The Southern California Edison Co., Los Angeles, is disposing of a bond issue of $11,500,000, a portion of the proceeds to be used for extensions in power plants and system.

Bids will be received by the Constructing Quartermaster, Fort Mason, Cal., until Nov. 16, for oil burning equipment, including fuel oil storage tank, for installation at Fort McDowell, Cal.

The Coast Oil Fields Supply Co., Los Angeles, has awarded a general contract to the Austin Co., Bartlett Building, for a new one-story plant, 50 x 200 ft., at 822-32 East Sixtieth Street, estimated to cost $27,000.

Fire, Oct. 14, destroyed the plant of the Pacific Coast Glass Co. and a large portion of the works of the Ganahl Lumber Co., Vernon Industrial District, Los Angeles, with total loss estimated at $850,000 including equipment. Both companies plan to rebuild. The loss of the first noted company approximates $350,000.

The General Motors Corporation, Detroit, is considering the construction of a new assembling plant at Oakland, Cal., to cost in excess of $400,000. C. S. Mott, vice-president, is in charge.

The Portland Railway, Light & Power Co., Portland, Ore., has arranged for a bond issue of $2,000,000, a portion of the proceeds to be used for extensions and improvements in electric plants and system.

Judson A. Jenkins, Tujunga, Cal., and Edward Greene, Glendale, Cal., are perfecting plans for the construction of a new ice-manufacturing plant, to cost about $65,000.

The Mohawk Oil Co., operating in the Signal Hill oilfield, near Long Beach, Cal., is having plans prepared by Leonard P. Wikoff, 546 Pine Avenue, Long Beach, architect, for a one-story machine shop, 40 x 150 ft.

The Emsco Tool Co., Los Angeles, has been formed with a capital of $1,000,000, and will build a plant at Seventieth and Alameda Streets, for which contract recently was awarded to the Austin Co., Bartlett Building. The company is headed by E. M. and J. S. A. Smith and J. M. Cummings.

The Roger Electric Fixture Co., Los Angeles, Cal., has been incorporated with $20,000 capital stock and will handle and manufacture electrical appliances. At present no manufacturing is contemplated, but within the next 90 days contracts will be let out for this work. Address care of Rudolph & Warne, 810 Union Bank Building.

The Tucker Rubber Corporation, Buffalo, has been incorporated with $300,000 capital stock and will manufacture mechanical rubber goods. It has secured the plant of the United States Rubber Reclaiming Co. and is now ready to install machinery. Mr. Tucker, who heads the company, was formerly connected with the Fiske Rubber Co. W. S. Timme, 350 Madison Avenue, New York, is corporate representative.

STEEL AND INDUSTRIAL STOCKS

The range of active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	37¾	39⅞	Lima Loco.	63¼	65
Allis-Chal. pf...	91	91	Midvale Steel ..	24¾	25
Am. B. S. & Fdy.	70¾	71⅞	Nat.-Acme	8¾	8¾
Am. B.S. & F. pf.	104	104½	Nat. En. & Stm..	38⅝	42
Am. Can	91⅝	94½	Nat. En. & S. pf.	92	92
Am. Can pf.....	106¼	106¾	N. Y. Air Brake	33	35⅞
Am. Car & Fdy..	155	156½	Nova Scotia Stl.	14½	14
Am. Locomotive.	68¼	70⅛	Otis Steel	7	7⅜
Am. Radiator ..	80	81	Otis Steel pf....	45	45
Am. Steel Fdries.	33⅞	35	Pressed Stl. Car	42½	50
Bald. Loco.	115¼	119	Pressed Steel pf.	80	84
Beth. Steel	46½	48⅝	Replogle Steel ..	8	8¾
Beth. Stl. 7% pf.	89¼	89¾	Republic	42¼	44⅝
Beth. Stl. 8% pf.	103	103	Republic pf. ...	88	88
Br. Em. Stl. 2 pf.	15	15	Sloss-Sheffield ..	40	40¼
Cambria Iron ..	40	40	Sloss-Shef. pf. ..	75	75
Chic. Pneu. Tool	81	81¼	Steel of Canada.	65¾	66
Colo. Fuel	23½	26	Superior Steel...	23½	23½
Crucible Steel ..	58½	61¼	Un. Alloy Steel..	30	30
Deere pf.	60¾	61⅛	U. S. Pipe.....	36	39¼
Gen. Electric ...	170½	173⅝	U. S. Pipe pf...	79½	82½
Gt. No. Ore Cert.	28¼	29⅞	U. S. Steel.....	86½	88
Gulf States Steel	71½	75⅝	U. S. Steel pf...	118¼	119
Harbison-Walk..	115	115	Vanadium Steel.	22¾	27⅜
Int. Har.	67¾	74¼	W'house Air Br.	79⅛	80
Int. Har. pf....	106	106½	Y'gstown S. & T.	62	63¾
Jones & L'ghlin.	107½	107½			

Receiver for Hydraulic Steel Co.

As a preliminary step in reorganizing the Hydraulic Steel Co., Cleveland, that company has been placed in the hands of a receiver in a friendly suit brought by the Savage Armstrong Corporation. Thomas B. Goodbody was named receiver by Federal Judge D. C. Westenhaver. The court conferred upon the receiver authority to continue operations. In the depression that followed the war the Hydraulic Company suffered heavy losses and impaired its assets to an extent that made a reduction of its capital stock advisable. Although fixed charges have been high, it is stated that since April 1 this year the earnings of the company have been sufficient to show a profit above all fixed charges.

Industrial Finances

Consolidated income account of the Replogle Steel Co., Wharton & Northern Railroad Co. and Ferro Monte Railroad Co. for the quarter ended Sept. 30, shows net loss of $79,789 after depreciation and maintenance, against $18,741 in the preceding quarter and $93,533 in the quarter ended March 31, 1923, making total loss of $192,063 for the first nine months of 1923. The balance sheet as of Sept. 30 showed reserves and accruals of $149,300.

The National Acme Co. for the quarter ending Sept. 30, last, showed net sales of $2,408,863, contrasted with $1,819,688 for the corresponding period last year. Net profits after bonds interest for the period were $101,810, against $30,977 for that period of 1922.

Sales of the J. I. Case Threshing Machine Co. for the first nine months of 1923 exceed by 20 per cent those in that period last year. Gross sales last year were $15,720,716. President Warren J. Davis, in commenting on earnings, declared that the financial status of the farmer, which demoralized the market, is improving and "these changes mean a restoration of confidence in the farmer and in the banker to whom he must turn for financing, and this, in turn, should be reflected in the implement industry by a growing volume of sales."

A preliminary certificate of dissolution has been filed by the Hartford Electric Steel Corporation, Hartford, Conn. All claims may be sent to Harry S. Blumenthal, 75 Willow Street, Hartford.

Subject to the approval of stockholders, the Northway Motors Corporation, Natick, Mass., will be merged with the Bessemer Motor Truck Co., the American Motors Corporation and possibly other companies with plants stretching practically across the country. The merger, if effective, will be completed in 1924.

The court has appointed Louis L. Driggs and A. Lapides receivers for the Driggs Ordnance & Mfg. Co., New Haven, Conn.

The Industrial Laundry Machinery Co., 110 West Fortieth Street, New York, recently incorporated with capital stock of $50,000, to manufacture laundry machinery and parts, will devote immediate activities to dealing in these lines. The company hopes eventually to take up manufacturing, but this, however, will be in the remote future. The incorporators are A. C. Thompson, M. Landau and S. S. Burnholz.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.20c. to 4.59c.
No. 12	4.25c. to 4.64c.
No. 14	4.30c. to 4.69c.
No. 16	4.40c. to 4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.55c.	.....
Nos. 22 and 24	4.35c. to 4.60c.	4.85c.
No. 26	4.40c. to 4.65c.	4.90c.
No. 28	4.50c. to 4.75c.	5.00c.
No. 30	4.70c. to 4.95c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.60c. to 4.85c.
No. 16	4.75c. to 5.00c.
Nos. 18 and 20	4.90c. to 5.15c.
Nos. 22 and 24	5.05c. to 5.30c.
No. 26	5.20c. to 5.45c.
No. 27	5.35c. to 5.60c.
No. 28	5.50c. to 5.75c.
No. 30	5.95c. to 6.20c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—41	—24	⅛ in. Butt	— 4	+19
¼ in. Butt	—46	—32	¼ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

Base Price* on No. 9 Gage and Coarser	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17 c. to 18 c.
High brass wire	17½c. to 18½c.
Brass rods	14¾c. to 15¾c.
Brass tube, brazed	25 c. to 26½c.
Brass tube, seamless	21½c. to 22½c.
Copper tube, seamless	23 c. to 24 c.

Copper Sheets

Sheet copper, hot rolled, 19¼c. to 20¼c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20		
			Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.55	$6.30
		90 lb.	6.65	6.40
		100 lb.	6.75	6.50
IC	$12.55	$10.70	IC	7.00	6.75
IX	13.95	12.55	IX	8.25	8.00
IXX	15.55	13.75	IXX	9.50	9.25
IXXX	17.10	15.30	IXXX	10.75	10.50
IXXXX	18.85	16.80	IXXXX	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	44c.
Bar	48c. to 50c.

Copper

Lake ingot	15¾c.
Electrolytic	15¼c.
Casting	14¼c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8¼c. to 8¾c.
Bar lead	10c. to 12c.
Solder ½ and ½ guaranteed	31c.
No. 1 solder	29c.
Refined solder	25c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	9½c. to 10c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	36c.

Old Metals

Business is very quiet and values are practically unchanged. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	10.75
Copper, heavy wire	10.25
Copper, light bottoms	8.50
Brass, heavy	5.75
Brass, light	4.75
Heavy machine composition	8.50
No. 1 yellow brass turnings	5.50
No. 1 red brass or composition turnings	7.25
Lead, heavy	6.00
Lead, tea	5.00
Zinc	4.00
Cast aluminum	15.00
Sheet aluminum	15.00